Mackinac Strait Pipeline
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620

Contractors and Engineers

DECEMBER 1953

RECEIVED DEC

CONCRETE FOR SHOPPING CENTER BUILDING — A dry batch discharged from a truck is mixed in a Ransome paver. Then the concrete is hoisted in the Universal double tubular tower to the desired floor level. *See story on Page 76.*

How To Obtain Concrete Which Will Have Minimum Shrinkage

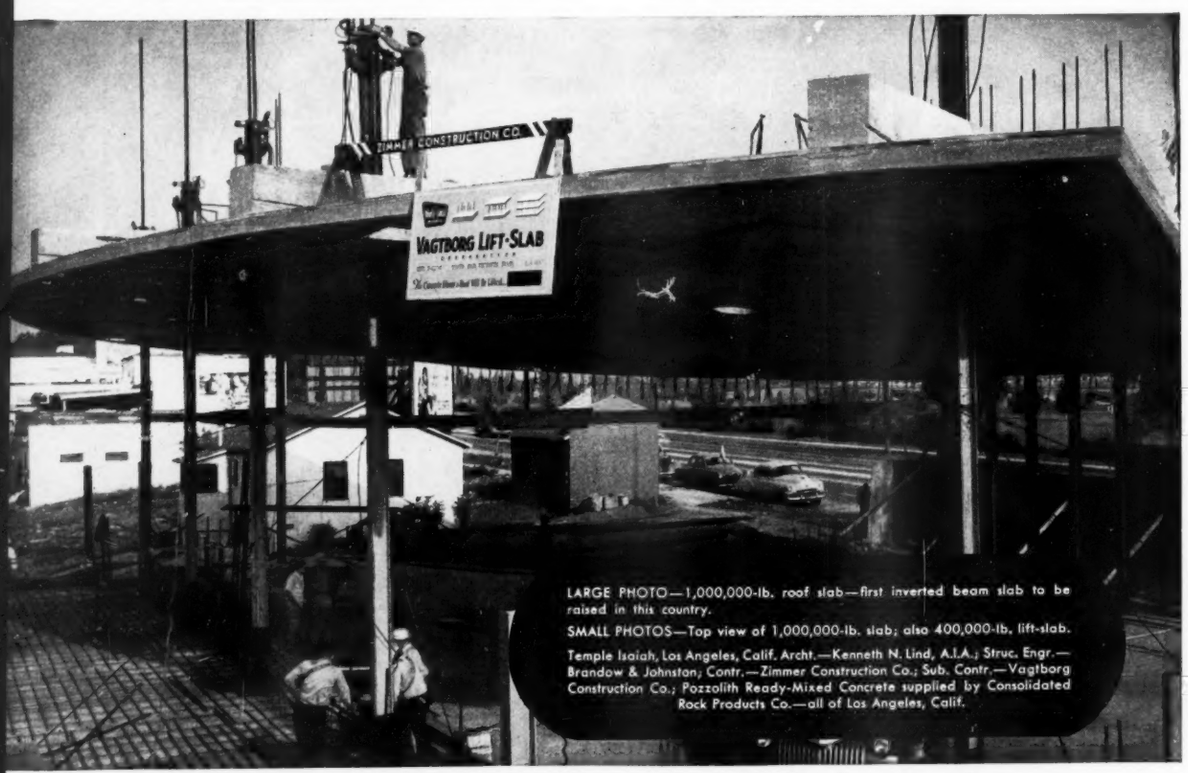
Drying shrinkage, as every concrete man knows, is a serious enemy of good concrete. Whatever the cement content of a mix or the water-cement ratio, drying shrinkage is governed mainly by *unit water content**. (Unit water content is the amount of water required per cubic yard of concrete.)

Pozzolith† is a positive aid in obtaining lowest unit water content, whatever the workability requirements.

For a given workability, the dispersion of cement with Pozzolith decreases the amount of water required in a cubic yard of concrete by approximately 15%. To the best of our knowledge there is no other material which will achieve a lower unit water content and yet maintain the required workability.

In addition to providing minimum shrinkage, this reduced water-cement ratio will result in concrete having substantially higher strength. Low permeability and increased resistance to freezing and thawing are other important advantages resulting from low unit water content with Pozzolith.

*U.S. Bureau of Reclamation Concrete Manual, 5th Edition, Page 40.
†Pozzolith . . . the cement-dispersing, water-reducing agent which makes available the optimum amount of air in concrete and fully complies with the water-cement ratio law. Pozzolith was developed by The Master Builders Company in 1932.



LARGE PHOTO—1,000,000-lb. roof slab—first inverted beam slab to be raised in this country.

SMALL PHOTOS—Top view of 1,000,000-lb. slab; also 400,000-lb. lift-slab.

Temple Isaiah, Los Angeles, Calif. Archt.—Kenneth N. Lind, A.I.A.; Struc. Engr.—Brandow & Johnston; Contr.—Zimmer Construction Co.; Sub. Contr.—Vagtborg Construction Co.; Pozzolith Ready-Mixed Concrete supplied by Consolidated Rock Products Co.—all of Los Angeles, Calif.

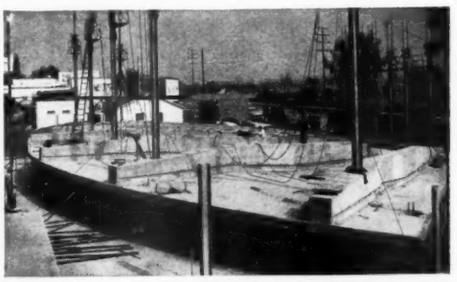
First Inverted Beam Lift-Slabs Are POZZOLITH CONCRETE

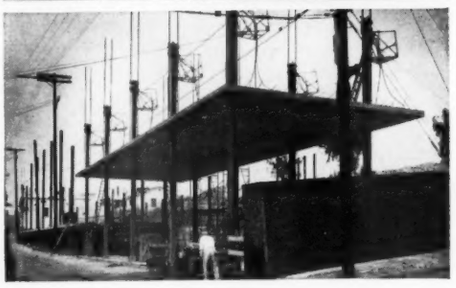
IN a letter about this job, Zimmer Construction Co., the contractor, said—"With the use of Pozzolith in our concrete we were able to . . . pour both slab and beams together with 3½" slump, yet were able to maintain the necessary workability so necessary in this type of pour without excessive vibrating.

"Further, with the use of Pozzolith we obtained a seven day test of 3,200 pounds and a twenty-eight day test of 4,600 pounds, allowing us to raise these slabs in seven days instead of the usual fourteen day delay."

Better, more economical concrete is obtained with Pozzolith† because it *reduces the unit water content* of a mix approximately 15%. As stated by the American Concrete Institute (ACI 613-44, Page 655)—"For a given set of materials and water-cement ratio, the unit water content (water required per cubic yard of concrete) is the most important basic factor affecting the quality of concrete." Obviously, for a given water-cement ratio, the mix requiring the lowest water content will also produce the most economical concrete.

Investigate the advantages of Pozzolith for your next job . . . it will enable you to obtain the required qualities *at lower cost than by any other means*. "See-for-yourself" Pozzolith demonstration kit supplied on request . . . without cost or obligation.





"IRON-CLAD" CONCRETE FOR HEAVY TRAFFIC AREAS

The Masterplate "iron-clad" concrete flo 4-6 times more wear-resistant than the plain concrete floor, also, corrosion-resis spark-safe, easy-to-clean, non-slip, non-du and economical. Non-colored and colored.

Section of Masterplate Floor. Note Thickness of Armored Surface.

Experience in all types of plants has pr the value of Masterplate "iron-clad" crete floors in helping to maintai smooth flow of production, reduce m tenance expense and improve plant sa

Only with Masterplate can a Masterplate armored" concrete floor with all its impo service advantages be obtained, because Masterplate contains the cement-dispe agent calcium lignosulfonate which mak possible to easily float a pound or more o tough, ductile metal on fresh concrete *keep it at the surface.*

Full information on Masterplate—for new f and resurfacing old concrete floors—and for-yourself" demonstration kit supplied o quest by the manufacturer, The Master Bui Co., Cleveland 3, Ohio.

COLORED CONCRETE FLOOR FOR LIGHT TRAFFIC AREAS

Colorcron is being widely used by contra to obtain uniformly colored, long wearing crete floors for show rooms, churches, sch apartments and offices; also for recrea rooms, patios, driveways, sidewalks, bro ways and garages. Floors can be scored to desired pattern.

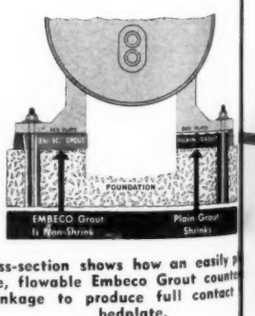
Color Plus Long Wear

Colorcron floors cost less additional than p ing the floor, outwear the best plain con floor, and have more uniform and more in color than is obtained from the use of ments put in the mix. Colors: light grey, grey, red, brown, black, green, dark green non-colored.

Full directions for the use of Colorcron ma obtained from the manufacturer, The M Builders Co., Cleveland 3, Ohio.

FOR NON-SHRINK GROUTIN

To avoid shrinkage—principal cause of f in equipment grouts—plant engineers use beco metallic aggregate, the material that duces a non-shrink flowable grout.



Cross-section shows how an easily p able, flowable Embeco Grout counte shrinkage to produce full contact bedplate.

Following are a few of the many other u Embeco non-shrink mortar: grouting a bolts; grouting steel floor grids; grouting a pipes through walls; caulking bell and pipe; patching floors, ramps and platform

A 16-page booklet of useful data and inf tion on the Embeco Non-Shrink Meth Grouting may be obtained from the ma turer, The Master Builders Co., Cleve Ohio.

the MASTER BUILDERS Co.
Subsidiary of American-Marietta Company
CLEVELAND 3, OHIO TORONTO, ONTARIO

magazine of mod

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Is Ready-Mix Concrete Dependable?

The above title was the subject of a recent talk given by Stanton Walker, director of engineering of the National Ready Mix Concrete Association with headquarters in Washington, D. C. Mr. Walker spoke at a luncheon meeting of the Concrete Industry Board of New York City. Like other cities, large and small, that make extensive use of ready-mix concrete, New York has been troubled on occasion with concrete that failed to measure up to the strength required. Concrete is one of the basic materials used in the construction industry, and serious trouble can develop when it becomes suspect through one particular method of mixing. The CIB, which according to its slogan is "organized for quality concrete", recognized the inherent danger in such a situation and sought expert advice in order to discover the cause of the trouble.

The advice was clear and uncompromising. Ready-mix concrete is no less dependable, according to Mr. Walker, than the producers who turn it out, the engineers who design and test the mix, and the contractors who use the concrete. Then becoming more specific, the speaker pointed out that all cements do not give the same strength; that some meet required tests by a comfortable margin, while others do not. Such differences can be traced back to the raw materials that are used by the various cement manufacturers. Therefore, it is up to the engineers to base their designs on the lowest-testing cement.

Ready-mix concrete must be produced with good equipment and trained personnel. Careful handling is essential to prevent segregation of the aggregate. Scales for weighing the ingredients have to be accurate. And workers at the plant should recognize that poor water control means poor concrete, especially when air-entrained mixes are used. Inspection at the batch plants, obviously, should be carried out with complete independence by owner representatives.

Contractors are also responsible for adequate mixing and water control, particularly when the mixing is done at the job site and not en route in the truck mixers. Superintendents and foremen accustomed to 1½-minute mixes with a paver or other large concrete mixers grow impatient while waiting 20 minutes or so for the drum on a truck mixer to complete the necessary number of revolutions. Drivers of truck mixers may not resist a contractor's demands to release the concrete before it is properly mixed. They may also comply with a request for more water to wash the concrete down the discharge chute—water that is not distributed through the batch and only weakens the concrete.

Improper placing of the concrete in the forms will also result in segregation of the aggregate. Over-vibration is another common offense, and the use of a fire hose to move the material along is not unknown in concrete handling. Hit or miss curing methods are still another reason for poor concrete.

Testing too, in Mr. Walker's opinion, can stand correction. At least three cylinders should be used in making a test, and he feels it is practically impossible to test core samples properly without sawing through them. Capping is not acceptable, since the test is essentially undertaken to indicate the strength of the concrete and not that of the capping material.

The Concrete Industry Board is to be commended not only for its awareness of a problem, but for its intention of doing something to correct it. Now that its members have been reacquainted with the importance of the fundamental factors that must be considered in making strong concrete, there is no reason why these rules or principles should ever be disregarded.

Colorado contractors, who have been experiencing a pre-March seige of tax confusion, can now breathe a sigh of relief since the State Supreme Court has held them exempt from the **ton-mile tax.** Imposed under the 1935 commercial carrier act, the tax was not collected from contractors at first. Later, they were held taxable. Now the court holds that contractors are exempt from the tax since they are not in the field of commerce for their own benefit.

At the same time, a new policy of sales **tax refunds** was announced for Colorado. This is designed to make sure a municipality, instead of a contractor, benefits from the exemption. Contractors will now pay the taxes, then secure a refund for material used. This eliminates a loophole which allowed them to obtain tax-exempt materials and divert unused portions to other purposes.

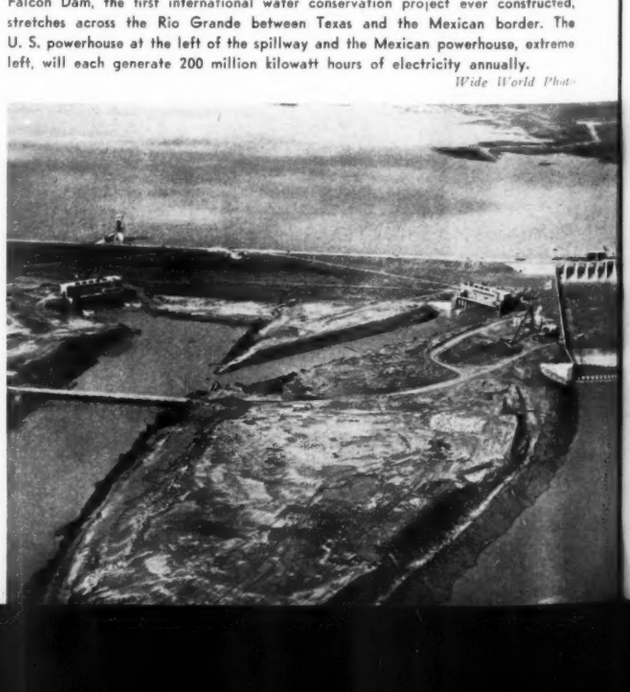
While part of the tax system is being cleared up in one state, **building codes** are being modernized in other parts of the country. A new amendment to Minneapolis' building code permits "panel face" construction on walls not supporting a building. Previously, all walls had to be of 8-inch-thick masonry. Baltimore County, Maryland, has almost completed work on its code which will protect property owners while permitting the use of newly developed materials.

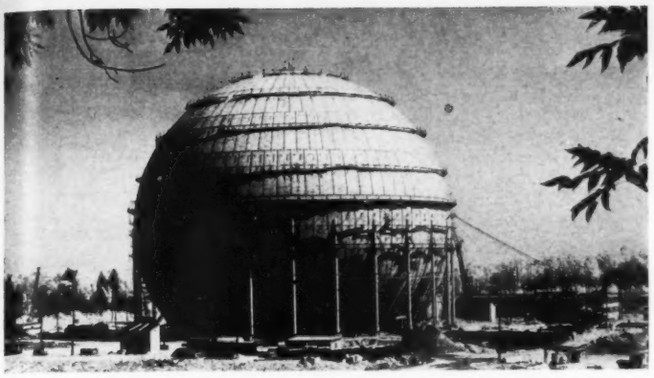
These materials, incidentally, may have to make room for still another **new building material**—plastic. It is now being used for school walls in an experimental application in Great Britain. Another proof that plastic is beginning to come of age can be seen in the new plastic pipeline which runs from the Williston Basin oil field in Montana to a railroad siding 9 miles away. This line, admittedly an experiment, is considered significant by some sections of the oil and plastics industries. Plastic is already being used extensively in irrigation and gas pipelines, and researchers are working constantly to make it less costly and more practical for oil pipelines.

Cost and feasibility—always important considerations in construction—seem to have been overcome for a **bridge project** that has been under discussion for 70 years. David D. Steinman, a U. S. engineer, has drawn up blueprints for a bridge across the Strait of Messina, connecting the island of Sicily with the Italian mainland, that is feasible structurally and financially. The project, according to plans, will be a suspension span measuring 12,000 feet from end to end, making it the longest in the world. At its lowest point, it will be 229 feet above sea level, allowing plenty of room for ships. The cost of the project is more than $6,000,000.

Falcon Dam, the first international water conservation project ever constructed, stretches across the Rio Grande between Texas and the Mexican border. The U. S. powerhouse at the left of the spillway and the Mexican powerhouse, extreme left, will each generate 200 million kilowatt hours of electricity annually.

Wide World Photo





The huge sphere that will house the prototype of an atomic power plant for use in submarines. More than 5 miles of welding was used to join the 682 inch-thick steel plates together.

Huge Sphere to House Atomic Reactor Tests

Towering higher than an 18-story building above what was formerly farmland at the Knolls Atomic Power Laboratory site near West Milton, N. Y., is the recently completed steel sphere in which the General Electric Co. will test-operate a prototype atomic power plant for submarines.

When the atomic reactor being built is finished, it will be installed in a submarine hull section which will be skidded through a large hole cut in the sphere. After the hole is closed, the tank will be filled with water, and the reactor will be tested under simulated seagoing conditions.

The sphere, built by the Chicago Bridge & Iron Co., Chicago, Ill., is designed to afford protection against the escape of radioactive material should the numerous safety devices which are to be used by G-E during the tests fail simultaneously. A total of 682 steel plates were joined together to make the tank which, with its supporting columns, weighs 3,850 tons. The structure is 225 feet in diameter. More than 5 miles of welding was used. Two welds around its middle are each 706 feet long. The sphere, now supported by still pillars, will be half immersed in earth and covered with concrete later on.

The atomic reactor is being built in Schenectady, N. Y., by G-E, which operates the Knolls Atomic Power Laboratory there for the Atomic Energy Commission. It is the first plant to use neutrons in what scientists term the "intermediate" energy range. Most reactors previously built employ lower energy for "thermal" neutrons. The new plant is called SIR, standing for submarine intermediate reactor.

In operation, energy from the fissioning or splitting of uranium atoms heats liquid sodium metal to a high temperature. The generated heat turns water into steam to drive the submarine's turbines which turn the propellor shafts.

Such a submarine will be able to cruise at high speed for months without refueling. It will be able to remain submerged for periods limited only by the endurance of the crew. Atomic engines do not require oxygen for their operation and a supply of oxygen can be carried aboard for the crew.

Remember the Blood Bank today!

Pennsylvanians Want More Roads, Poll Shows

Despite the record-breaking construction, reconstruction, resurfacing, and widening on Pennsylvania's 41,000-mile highway system last year, a public opinion poll shows the public thinks construction is proceeding too slowly. In a report to Governor John S. Fine, Secretary of Highways E. L. Schmidt said the majority of those polled believe more money should be spent for highway work, even though this means higher taxes for highway users. The poll was conducted by the Pennsylvania Department of Highways.

Seventy-three per cent of those interviewed favor the spending of more money for highway construction. Sixty-four per cent feel highway building is not being done fast enough. About 56 per cent would like to see more highway construction work done, even if it means more highway-user taxes.

A total of 4,173 persons, evenly divided between men and women, were asked seven definite questions. Residents of both rural and urban areas were represented.

The only marked variation between city and rural groups appears on the question of highway bond issues. Only 35 per cent of those living in cities favor this form of financing compared with 52 per cent in rural sections. Fifty-nine per cent declared driving is less enjoyable now than it was three or four years ago. Streets and highways in large cities are overcrowded in the opinion of 87 per cent, while 39 per cent said there is overcrowding evident in rural areas. Signs and markers on state highways were declared satisfactory by 79 per cent.

Wisconsin specified SHEET ASPHALT

35th Street, Milwaukee, Wis. (U. S. Routes 16 and 18) paved with heavy-duty Texaco Sheet Asphalt by Schneider Borchert Company, Milwaukee.

Milwaukee's 35th Street is more than a local thoroughfare. Traffic of two of Wisconsin's principal highways, U.S. 16 and 18, also passes over this street on its way through the city.

To serve this exceptionally heavy traffic, a two-course Texaco Sheet Asphalt pavement has been constructed on a section of 35th Street under State Highway Department supervision. This dense, resilient pavement readily absorbs punishing impact, which enables it to withstand many years of hard wear with a minimum of maintenance. Because it is resilient, as well as joint-free, Texaco Sheet Asphalt does not lose its smooth riding quality. In common with all types of Texaco Asphalt paving, Sheet Asphalt is immune to salts used for ice control during the winter months.

Heavy-duty Sheet Asphalt may be the answer to your own highway, street or airport surfacing problem. If not, Texaco Asphalt Cements, Cutback Asphalts and Slow-Curing Asphaltic Oils offer a number of other types of surfacing, which vary in durability and cost. One of these types will fit your set of conditions exactly.

Helpful information concerning all types of asphalt roads and streets is supplied in two booklets, which you can obtain without obligation by writing our nearest office. If you would like to discuss your paving problem with our asphalt representative in your area, his experience is at your service.

THE TEXAS COMPANY, Asphalt Sales Dept., 135 E. 42nd Street, New York City 17

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TEXACO ASPHALT

Asphaltic Pavement For Canadian Base

New bituminous paver lays plant-mix quickly; lanes of varying length and width are blended into old pavement

Plant-mix is laid on uneven subgrade by a Pioneer BP-6 paver at the Penhold Air Force Station in Alberta, Canada.

WITH MAXIMUM ECONOMY in time and money, engineers at the Royal Canadian Air Force Station in Penhold, Alberta, Canada, have completed a sizable and difficult paving program. The important training center is located near Red Deer, midway between Calgary and Edmonton. Its paving program this year called for the laying of a 2,700 x 150-foot 2½-inch-thick asphalt hot-mix pavement on a parking apron, a 1,300 x 100-foot pavement on a main runway, and a 3,000 x 20-foot pavement on an access road.

Using native pit gravels with 200 to 300 penetration asphalt for the plant-mix, together with an improved laydown machine for handling the material in a uniform manner, the paving crew pushed the job ahead rapidly despite the unfavorable working conditions.

Two Year Program

This year's work completed a program begun in 1952, when grading work was done and from 14 to 24 inches of thickly compacted granular subbase was placed. The grading plans allowed most of the old payment to remain intact, making the job more economical. New grades were established when the pavement was covered by the present new ballast course and plant-mix.

Although subbase compaction was worked out to develop maximum load-bearing strength, practically none of it was finished off perfectly smooth. Also, the mix used was an adequate but random blend of pit-run aggregates which was not precisely screened. Plans called for both long and short lanes. In some cases, lanes of varying widths were required so that edges of the parking apron could be blended into existing facilities. These factors, none of which are considered conducive to a fast job, were complicated further by the exceptionally rainy summer.

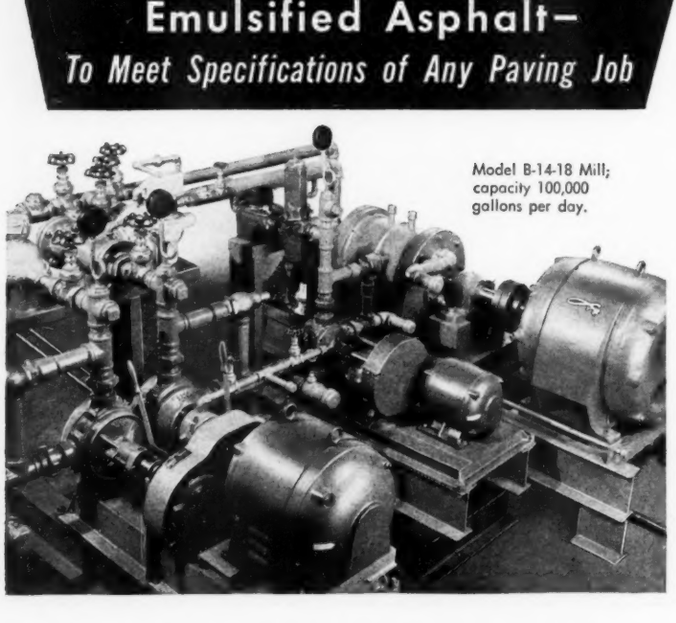
In spite of all this, a special paving crew of RCAF enlisted experts, working out of the Calgary headquarters office, completed the job before the normal fall rains set in. Crews worked 12 to 14 hours a day, weather permitting. The subbase was prepared by priming the surface with 0.25 gallon of MC-O asphalt. Two small service-type portable hot-plants turned out 700 tons of material a day. Mineral filler for the hot-mix was pit-produced and run through a simple screening plant located about 9 miles from the station. Rented trucks hauled the filler to the plant site on the field.

The material was high enough in fines smaller than 100 mesh to soak up excess asphalt. Although about seven per cent of this had to be used in the mix, no fat spots developed when the mix was laid. And it was sufficiently dense so that no armor or sealcoating was necessary.

Paving

Hot-mix material was hauled in rented trucks from the asphalt plant to the laydown machine. By means of a separate construction, haul road construction traffic was separated from the normal vehicular traffic using the main gate and streets of the base. Paving was done with a Pioneer Continuflo BP-6 bituminous paver which was particularly suited to the field conditions at Penhold. This machine, recently introduced by Pioneer, permitted instant adjustment of from 9 to 12½

Your Best Sources of Emulsified Asphalt— To Meet Specifications of Any Paving Job



Model B-14-18 Mill; capacity 100,000 gallons per day.

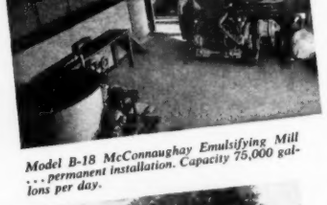
Each Licensee Is Equipped With Advanced *McConnaughay* Emulsifying Mill of This Type

Look for the nearest McConnaughay Licensee and you'll find the best source of Emulsified Asphalt to meet the specifications of any paving job. Here's why:

Each licensee has a McConnaughay Emulsifying Mill of the type illustrated above, *permanent* or *portable*, built to individual requirements for capacities up to 100,000 gallons per day. All mills make emulsions of the same high quality. All have outstanding records for dependability, extending over twenty years of successful operation.

In addition to manufacturing the mills and emulsifying agents, the McConnaughay organization supervises the production of all its Licensees; also does active research in its Lafayette laboratory as well as on the job, complementing the extensive service offered by the Licensees.

When you are figuring on any road, street or general paving job, and looking for the best source of Emulsified Asphalt, get in touch with your nearest McConnaughay Licensee or contact . . .



Model B-18 McConnaughay Emulsifying Mill . . . permanent installation. Capacity 75,000 gallons per day.

Portable plant with Model B-14-18 Mill. Capacity 100,000 gallons per day.

McCONNAUGHAY LICENSEES Operating K. E. McConnaughay Emulsified Asphalt Plants

Pan-Am Southern Corporation
New Orleans, *Louisiana*
(Also serving Alabama and Mississippi)

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Yarmouth, *Maine*

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James Huggins & Sons, Inc.
Malden, *Massachusetts*

Bituminous Materials Co.
Jackson, *Michigan*

Albany Asphalt & Aggregates Co.
Albany, *New York*

Knight Paving Products, Inc.
Gardenville, *New York*

Knight Paving Products, Inc.
Ithaca, *New York*

Knight Paving Products, Inc.
Rochester, *New York*

Ronald Kenyon Construction Co.
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Providence 7, *Rhode Island*

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Fauber Construction Co.
Lafayette, *Indiana*

Brookman Construction Co.
Muncie, *Indiana*

Bituminous Materials Co.
Terre Haute, *Indiana*

Wabash Valley Asphalt Co.
Terre Haute, *Indiana*

Asphalt Materials and Construction, Inc.
Indianapolis, *Indiana*

Eastern Representative:

John A. Dow
157 Church St.
New Haven 10, *Connecticut*

SPECIFICATIONS OF THESE COLD-MIX PROCESSES AVAILABLE ON REQUEST

1—Penetration Macadam, 2—Open-Graded Plant Mix, 3—Open-Graded Road Mix, 4—Dense-Graded Plant Mix, 5—Dense-Graded Road Mix, 6—Mat Coat, 7—Seal Coat, 8—Sand Mix, 9—Sand Honing, 10—Patching.

K. E. McCONNAUGHAY
EMULSIFIED ASPHALT
Plants and Processes
LAFAYETTE, INDIANA

feet and rapid adjustment to widths down to 5½ feet. Thus, time-consuming lags while widths were changed on the machine, as well as extensive raking, were eliminated.

The uneven subbase was covered uniformly by high-frequency oscillating compaction and tiltable-screed finishing provided by the new machine. Longitudinal joints were matched evenly as the paver moved along. It was estimated the finished pavement would not exceed 40 inches of roughness per mile if measured electronically by modern instruments. THE END

N. J. Turnpike To Be Extended

Motorists will be able to drive from Bayonne, N. J., to downtown New York City in less than 15 minutes and to Newark, N. J., from Bayonne in less than seven minutes when the proposed Newark Bay-Hudson County extension to the New Jersey Turnpike is completed. The addition will connect the Newark Airport interchange with Bayonne, Jersey City, and the Holland Tunnel.

Sale of $150,000,000 worth of 3⅜ per cent bonds to finance construction has been completed. Initial contracts call for the building of pier foundations for a new bridge across Newark Bay, the largest single portion of the extension.

Expected to be ready for traffic before April, 1956, the extension will relieve congestion on existing highways in Hudson and Essex counties. It will serve as a link for industrial, waterfront, and air traffic between the New York and New Jersey docks and Newark Airport.

The central portion of the bridge over Newark Bay will be a continuous truss span with a tied arch center span over the channel. The span will have a clearance of 135 feet above mean high water and a width of 550 feet. Vehicles will enter the western bridge approach at the Newark Airport interchange from either direction on the turnpike or from adjoining roads. At this end of the bridge, approach will be by means of direct connection ramps. To the east, the approach from the bridge extends across the Bayonne peninsula and connects with the proposed expressway. It will also connect with Avenue E in Bayonne and with the expressway through Jersey City to the Holland Tunnel Plaza.

Two traffic interchanges are proposed in Jersey City, as well as entrance and exit facilities at the Holland Tunnel Plaza. There will be two service areas along the extension, which will consist of two opposing 36-foot roadways, each accommodating three lanes of traffic. A 6-foot-wide median strip will separate the opposing traffic along the roadway, while a 4-foot strip will be used on the bridge.

Thinly populated areas of the world which offer good possibilities for further settlement by occidental people are in southern Canada, east central South America, the Mediterranean coast of Africa, north central Asia, and Australia, according to the Twentieth Century Fund.

Highway Research Reports

A bulletin covering the effect of pellet and flake forms of calcium chloride as admixtures to portland-cement concrete, and a report outlining areas for research in the field of geometric highway design are available from the Highway Research Board of the National Academy of Sciences-National Research Council, 2101 Constitution, Washington 25, D. C.

Bulletin 75 contains a paper by J. T. McCall, assistant professor of applied mechanics; and R. J. Claus, assistant professor of civil engineering, Michigan State College. In addition to a study of the effects of calcium chloride on five properties of portland-cement concrete, a short investigation on the relative effects of water and moist curing is reported.

Special Report 12 on geometric highway design presents problem statements for 26 subjects for which data is needed. It is adaptable for both large and small unit research. Among the phases requiring research are the width and cross section of a median, traffic behavior on a cloverleaf inner loop, braking distances for representative vehicles, and spacing of safe-passing sections on two-lane highways.

Herak Appointed by PCA

The Portland Cement Association, Chicago, Ill., has appointed Donald H. Herak district engineer of the Spokane, Wash., office. He joined the staff of the association in 1951, as field engineer in Spokane.

THIS SHOVEL KEEPS TRUCKS ON THE JUMP

The job shown here is an excavation for an addition to St. Benedict's Church, Irving Park and North Bell, Chicago, Ill. You'd call it a tough loading job anywhere you saw it. The material is concrete slab, brick, dirt and miscellaneous rubble from buildings that have been torn down. It's awkward stuff to handle. But Ray Trumbull, Chicago excavator, finds his Cat* No. 6 Shovel keeps five big trucks busy and loads out 800 cubic yards a day.

Mr. Trumbull also owns two Caterpillar HT4 Shovels. He reports: "Our Caterpillar machines stay on the job with low maintenance costs and make our operations very successful."

Watch a No. 6 Shovel at work. Watch it dig in and pick up a good two-yard bucket load. Then time its cycle as it swings to the truck, dumps and returns. You'll see why owners consistently get more production than with other makes of equipment. Every part is built with extra strength, for hard work and long life. Controls are simple to operate.

Ask your Caterpillar Dealer for an on-the-job demonstration. Make him prove how these shovels can deliver more yardage, with less down time, at lower cost. Call him today!

Caterpillar Tractor Co., Peoria, Ill.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

Concrete-Handling Methods From Equipment Viewpoint

■ A new manual ties together the use of equipment relative to good practice requirements of handling and placing concrete. The combination educational and equipment booklet is offered by the Gar-Bro Mfg. Co., 2415 E. Washington Blvd., Los Angeles 21, Calif.

The booklet discusses many phases of concrete handling in some detail and makes recommendations as to the equipment most suitable for particular operations. Reference notations alongside the text make it possible for the reader to find the machinery mentioned in the discussion in the separate section listing Gar-Bro equipment.

The approach taken in the discussion is that equipment requirements will be determined by specifications; job conditions relative to terrain, material supply, or delivery; quantity of concrete; hourly requirements; and elevations. The company has devised check lists on which details of these factors can be listed to help make a final choice of method and equipment for most efficient operation.

The booklet is divided into four main sections. Following a discussion of basic facts about concrete, it takes up an explanation of procedures involved in measuring cement and aggregates by volume and weight, and a discussion of ready-mixed concrete. A section on handling and transporting goes into considerable detail on concrete hoppers, wheelbarrows, powered carts, concrete buckets, pumps, and conveyors to indicate the most efficient use of this equipment for particular operations.

The discussion of placing concrete includes a section on depositing the concrete and gives details on the correct uses of collection hoppers and drop chutes, straight line chutes, and concrete bucket attachments. An additional section deals with placing concrete under water. The booklet also contains several sketches reproduced from the Concrete Manual of the Bureau of Reclamation showing correct and incorrect methods of handling, transporting, and placing concrete.

To obtain this literature write to the company, or use the Request Card that is bound in at page 18. Circle No. 393.

Manager for Roebling's

Forest S. Burtch has been appointed product sales manager of the newly formed construction materials department of the John A. Roebling's Sons Corp., Trenton, N. J., a subsidiary of Colorado Fuel & Iron Corp. Elmer A. Trask has been named to succeed Mr. Burtch as wire rope salesman. Both men will operate from the company's Trenton headquarters.

Mr. Burtch, who has held several executive sales positions for the past ten years, joined Roebling's in 1923. Mr. Trask has been with the firm for 29 years, serving most recently as Chicago district manager.

The creation of the new department now makes available, through a single source, the complete Roebling line of wire and standard steel products for prestressing concrete.

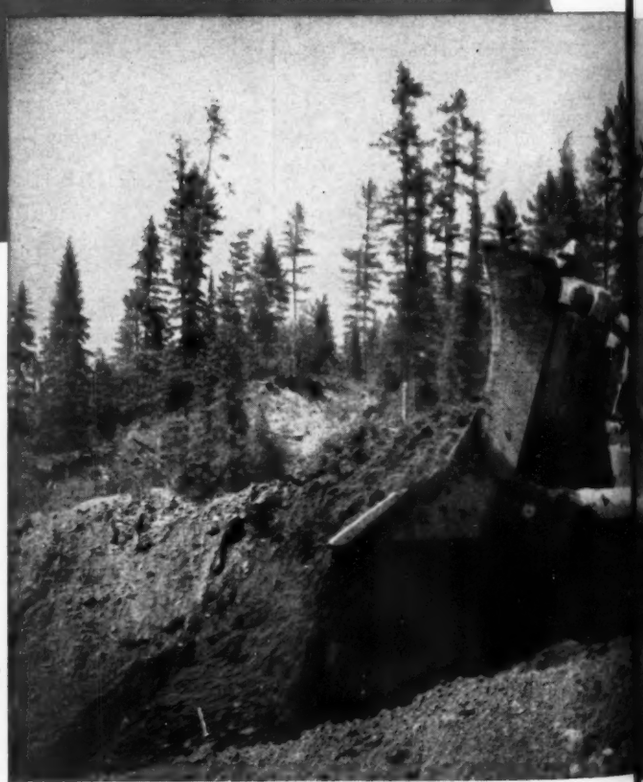
Two Get Legion of Honor

Two officials of the International Road Federation, 550 Washington Bldg., Washington 5, D. C., have been awarded the French Legion of Honor in recognition of their contribution to road development in France and the French colonies.

The awards were made to Frank T. Magennis, chairman of the federation, and B. C. Budd, director and past chairman. The former is vice president of the Goodyear Tire & Rubber Export Co., while the latter is vice president of the Packard Motor Car Co.

Founded by businessmen in 1948, the IRF is a nonprofit service organization which encourages the development and improvement of highways throughout the world. It draws its memberships from 45 countries.

HOW TO GET MORE WORK FROM ENGINES



One of hundreds of pieces of Texaco-lubricated equipment used in the construction of Hungry Horse Dam, Montana

TUNE IN: METROPOLITAN OPERA radio broadcasts every Saturday afternoon. See newspaper for time and station.

TEXACO

CONTRACTORS AND ENGINEERS

Names in the News

Upham Studies Proposed Egyptian Highway System

The means of constructing a modern road system in Egypt, including a highway over difficult desert terrain, is being studied by Charles M. Upham, consulting engineer of Washington, D. C. The work, contracted to Arthur D. Little, Inc., is being done under the Point 4 program for the area. Mr. Upham's inspection trip is expected to keep him in Egypt for several months.

Earlier this year, Mr. Upham visited the country for a brief survey. He decided no ordinary construction would suffice for the area because of the technical problem posed by silt, which is native to a large part of the country.

M-C&S Corp. Acquires Midwestern Subsidiary

Through an exchange of shares, Merritt-Chapman & Scott Corp., New York, N. Y., has acquired a 98.2 per cent interest in the Fitz Simons & Connell Dredge & Dock Co., Chicago, Ill., effecting a consolidation of activities of two of the oldest construction companies in the nation.

Fitz Simons & Connell, an 81-year-old midwestern construction company, is active in industrial, marine, and heavy construction with most of its operations centered in Illinois and Indiana. As an operating subsidiary of Merritt-Chapman & Scott, the company will expand its scope of construction activities in the midwest.

Under a proposal approved by the respective boards of directors, Fitz Simons & Connell shareholders were offered eight shares of Merritt-Chapman & Scott common stock for ten Fitz Simons & Connell shares. As of the expiration date of the offer, a total of 56,343 of the 57,389 outstanding shares of Fitz Simons & Connell stock were deposited for exchange.

The transaction involved the issuance of 45,074 Merrit-Chapman & Scott shares, bringing the company's total number of shares outstanding to 705,393.

James Retires from BPR

After 43 years of service with the Bureau of Public Roads, Department of Commerce, Edwin W. James has retired as chief of the inter-American regional office. Beginning in 1929, when Congress extended financial and technical aid to the Central American countries in the development of the Inter-American Highway, Mr. James has been continuously in charge of this work.

Besides serving as advisor to South American governments on important road problems, he has also been a representative of the U. S. at international road conferences. Mr. James, whose writings have been published both in English and Spanish, won first prize in a world-wide competition by the International Association of Road Congresses for one of his books. In recognition of his long and distinguished career, he was awarded the Department of Commerce medal for exceptional service in 1950.

New VA Administrator

The Veterans Administration has announced the appointment of Col. Raleigh M. Edgar as assistant administrator for construction, succeeding Col. Frank H. Dryden, who has retired after seven years. Col. Dryden will continue to serve the VA on a consultant basis when such services are required.

Col. Edgar has been with the VA since 1946, when he was separated from the Army. He started as chief of construction at the Columbus, Ohio, branch office and was transferred to Washington in 1949, as chief of the construction division.

During his seven years with the VA, Col. Dryden has been responsible for the design and construction of new hospitals, additions, and conversions, representing an investment of about $700,000,000 in land and structures.

Nichols Is AEC Manager

Maj. Gen. K. D. Nichols has been named to succeed Marion W. Boyer as general manager for the Atomic Energy Commission, Washington 25, D. C.

Gen. Nichols, formerly chief of research and development for the Army, retired from military service upon taking the AEC appointment. His long experience in the atomic energy field and his technical and administrative ability made him a natural choice for the position.

Mr. Boyer, who assumed the post for a term of three years, is returning to the oil industry where he served before joining the AEC.

Lt. Col. Richardson Named

A veteran of the Korean War, Lt. Col. Herbert Richardson, Jr., has been assigned executive officer of the Galveston District of the U. S. Corps of Engineers, Galveston, Texas. Besides providing staff assistance to the district engineer in directing, supervising, and managing, he will also be the security officer for the district.

Lt. Col. Richardson succeeds Lt. Col. Leslie M. Gross who has been transferred to Ft. Belvoir, Va.

SIMPLY keep your engines clean—free from power-stealing carbon and sludge—and they'll stay on the job and out of the repair shop. Lubricate with one of the famous *Texaco Ursa Oil* series—*a complete line* of lubricating oils for all heavy duty gasoline and Diesel engines.

Whatever the type, size or speed of your engines, whatever the fuel, there is a *Texaco Ursa Oil* exactly right to assure full-power performance . . . low maintenance costs and minimum fuel consumption. A Texaco Lubrication Engineer will gladly help you make the proper selection.

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For chassis lubrication, *Texaco Marfak* assures longer lasting protection against wear and rust. It won't pound or squeeze out of bearings, it seals out dirt and moisture.

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FOR ALL CONTRACTORS' EQUIPMENT

DAM AND RESERVOIR ADD TO CITY WATER SUPPLY

Combination earth and concrete dam is under construction; includes stilling basin, outlet works, and spillway bridge

By ALBERT C. SMITH, Field Editor

Shale is loaded into a Caterpillar No. 20 bottom-dump by a Northwest shovel at the spillway excavation. In the background, workmen set up forms for one of the first pours on the spillway. *C. & E. Photo*

A COMBINATION earth and concrete dam, to be known as Hoover Dam, is now under construction about 12 miles north-northeast of Columbus, Ohio, on Big Walnut Creek. Named after the Hoover brothers of Columbus, the dam and reservoir will be used to augment the raw-water supply of the city.

The contract was awarded early in February to the J. A. Jones Construction Co., Charlotte, N. C., on their low bid of $6,680,198. Work is expected to be completed early in the summer of 1955.

In addition to the construction of a combination earth and concrete dam, the contract includes the building of an adjoining stilling basin, complete outlet works, and a spillway bridge, plus the clearing of the 3,240-acre reservoir area. The spillway, of the gravity-section overflow type, is constructed of mass concrete and is 680 feet long. Mass concrete gravity-section abutment walls act as retaining walls for the earthen embankments which extend to hills on each side. The over-all length of the dam and spillway is 2,610 feet. The top of the earthwork rises 112 feet above the lowest point of the foundation.

The 8½-mile-long reservoir formed by the construction of this dam will have a spillway height capacity of 19.6 billion gallons or 60,200 acre-feet of water. The surface area will cover 2,825 acres. Stored raw-water flow will be controlled by the outlet works; softening and filtration treatment will be handled by a plant to be built downstream.

At the present time, the city's water supply is obtained from two smaller reservoirs on the Scioto River and from wells in Alum Creek Valley, and by about 1957, these reservoirs will have reached their limits to satisfy the demands made on them. The greatly increased demands on the water supply during the past ten years, particularly during the summer months, has also created serious pumping and distribution problems to be solved.

Design

The trapezoidal-shaped earthen embankment, with a 24-foot roadway section on top, consists of an impervious core and semi-impervious fill placed on a prepared foundation. Side slopes are 3 and 3.5 to 1. The impervious core has a 20-foot-wide top section and side slopes of ½ on 1. It is placed on a cutoff trench that has a bottom width of 20 feet.

The concrete spillway averages about 85 feet in height from base to crest. The full width of the spillway and the stilling basin is slightly over 210 feet. Rising out of the crest are seven piers spaced 85¼ feet on centers for supporting the bridge. The spillway's 680-foot length is divided into seventeen 40-foot-wide monoliths.

Construction Procedure

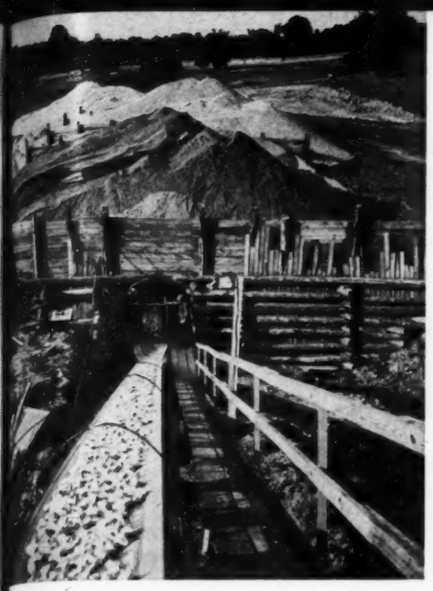
Because the entire spillway is located to the east of the stream channel, a plan was adopted to proceed first with the construction of the foundations for the spillway and stilling basin, and the east and west abutment walls. After the east abutment is completed, the foundations for the east embankment can be started and earthwork carried up to required elevations.

During this period, the stream will follow its normal line through the area where the west embankment will be built. When the time to begin work on the west embankment arrives, a cofferdam composed of impervious materials will be built across the stream at a point further upstream from the upstream toe of the earthwork. This cofferdam will be extended south where it will butt against the spillway at a point directly west of monolith No. 12. This will divert the stream away from the west embankment and through monoliths No. 10 and 12, which will be held down to a lower elevation than the other monoliths in the construction of the spillway. During the dry season and after the west embankment is complete, monoliths 10 and 12 will be closed by first building a second cofferdam across the relocated channel to divert the flow through four 4 x 6-foot sluiceways located west of monolith 13. Two of these sluiceways will be gated and the other two will be plugged at a later date.

Grading

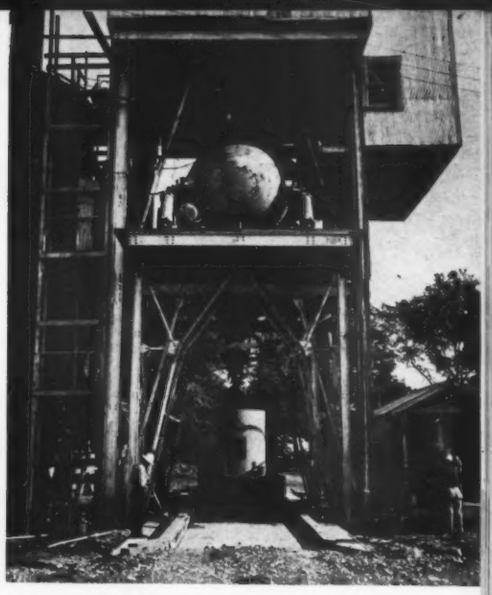
The contractor moved in early this year and started subcontractors working on clearing and grading. Several access roads and temporary bridges were constructed, permitting heavy equipment to move over the area.

H. N. Rodgers & Son, of Memphis, Tenn., earthwork subcontractor, started spillway excavation with a Northwest 2½-yard shovel and four Caterpillar bottom-dump wagons. When hard shale was hit, four wagon drills were brought in. Holes are drilled from 6 to 12 feet deep and on 4-foot centers with Ingersoll-Rand bits. The Du Pont 40 per cent dynamite is fired with electric caps. About 200 holes are drilled for each shot. Air is supplied by



A horizontal conveyor under the stockpiles feeds aggregate to a Marco elevating conveyor.

An over-all view of the Johnson automatic batch plant. Aggregate is brought to the bins at the top by the elevating conveyor at the left.



Concrete for Koehring mixers is dumped into Johnson buckets set on the Dorsey trailer.

two Ingersoll-Rand 600 compressors.

In the concrete masonry section of the dam, the final 12 inches of rock is removed by jackhammers and pneumatic spades so that rock is left sound and undisturbed. Because shale tends to disintegrate when exposed to air, Hunt Process Black is applied to seal the surface.

Batch Plant

The batching and mixing plant, set up on the east side of the river, is a short haul from the dam. The plant consists of a conveyor-fed Johnson automatic batch plant with two Koehring 4-yard tilting mixers, capable of turning out 1,500 yards of concrete a day.

Sand and four sizes of aggregates are hauled in by trailers and dumped next to the line of stockpiles. Dozers shape the material into stockpiles. Aggregates are transported to the plant by a Marco 30-inch horizontal conveyor that runs for 272 feet inside a 90-inch Armco pipe under the line of stockpiles. Holes 18 inches square with steel gates control the flow of material onto the rubber belt. The 6-inch stone, however, requires a 24 x 30-inch hole with a Jeffrey vibrating feeder. The conveyor is powered by a 10-hp electric motor.

When they reach the end of the horizontal belt, the aggregates are transferred to a 275-foot inclined conveyor powered by a 40-hp electric motor. At the top of the plant, the swivel chute operator keeps the 400-cubic-yard 5-compartment bin filled. Cement is hauled by Trailmobile bulk carriers and transferred by bucket elevator to the 270-barrel bin on top of the plant or the 6,470-barrel storage bin at the side of the plant. Flyash from local steam plants is stored in a 1,645-barrel auxiliary silo and batched from a 220-barrel bin on top of the plant.

Cement, flyash, and aggregates are weighed and recorded automatically and dropped into the 4-yard mixers mounted on a platform below. Each batch is mixed for 2½ minutes and then dumped into a hopper. Water is pumped from an artificial pond by two Fairbanks-Morse 250-gpm electric-powered pumps. Compressed air for operating the plant is supplied by a Worthington 1,250-cfm stationary compressor.

Typical weights for a 1-cubic-yard batch are:

Cement	282 lbs.
Flyash	94 lbs.
Sand	779 lbs.
Stone, ¾-inch	584 lbs.
Stone, 1½-inch	584 lbs.
Stone, 3-inch	688 lbs.
Stone, 6-inch	785 lbs.
Water	207 lbs.
Vinsol Resin	24 oz.

Concrete is hauled from the plant to the pour in Johnson 4-yard bottom-dump buckets carried on low-bed trailers. The contractor uses one 15-ton Dorsey and two 20-ton Rogers trailers, each equipped with a special frame for carrying three buckets. However, only on the first trailer out each day, are the three buckets loaded. After that, one slot is left open to take the empty bucket which the crane dumps as the other trailer goes back to the plant.

Placing

When concrete is placed in isolated areas, the buckets are handled by a Bucyrus-Erie 54-B crane. All other pouring is done by an American Revolver crane that travels on rails up and down the stilling basin slab. A 140-foot boom reaches the highest pours.

Concrete is placed in 5-foot lifts by the stairstep method and vibrated internally. Blaw-Knox cantilever panel forms are raised during the day's first 8-hour shift, and pouring is done at night during the second shift. After each pour, the laitance is removed with a high-pressure air-water jet. Forms are stripped after 30 hours. A 6-day interval is required between successive lifts. With this method of batching and placing, the contractor is placing about 1,000 cubic yards of concrete a day.

Quantities and Personnel

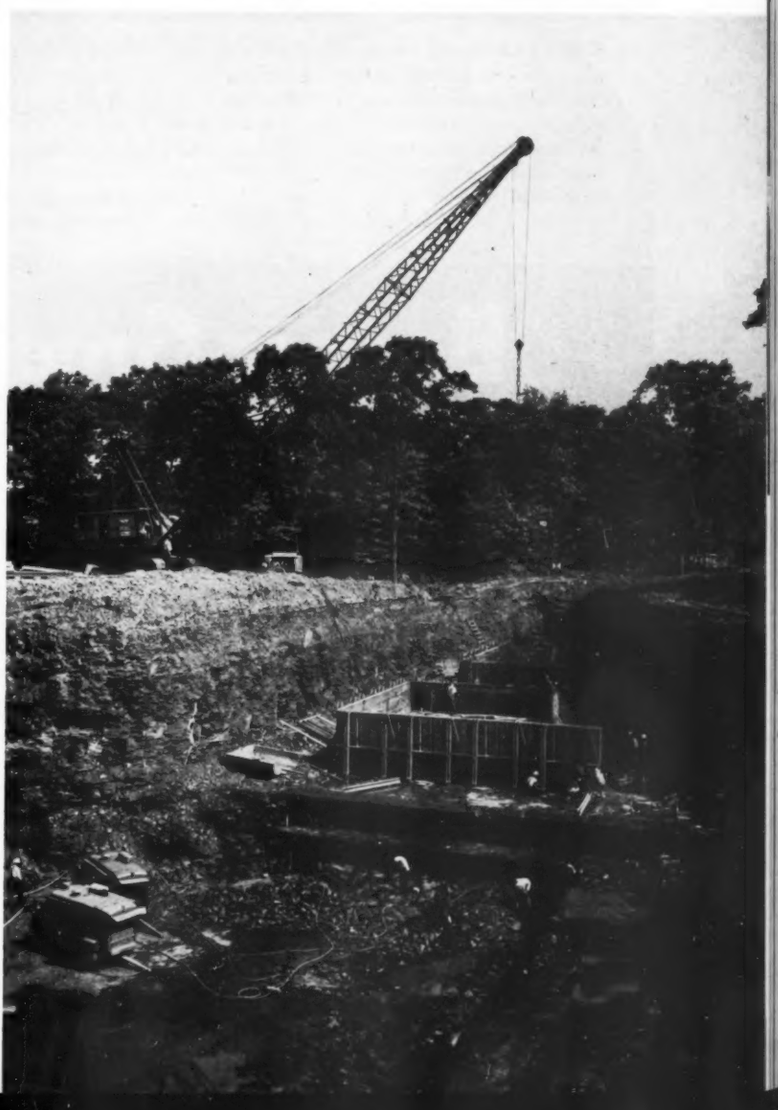
Major quantities include:

Concrete	177,000 cu. yds.
Common excavation	670,000 cu. yds.
Rock excavation	133,000 cu. yds.

E. F. Biggs is project manager, W. E. Smalley is general superintendent, and P. Klinck is engineer for the J. A. Jones Construction Co. R. A. Anderson is office manager.

Construction is being carried on under the direction of Burgess & Niple, Columbus, consulting engineers, with the cooperation of Robert T. Oestreicher, mayor; Harry D. Metcalf, director of public service; and Paul C. Laux, superintendent of the division of water. Ben A. Bare, resident partner, is in charge. THE END

C. & E. Photos



Blaw-Knox cantilever forms are set up for the second lift pour on the east abutment. A Bucyrus-Erie 54-B crane handles both the forms and the concrete buckets.

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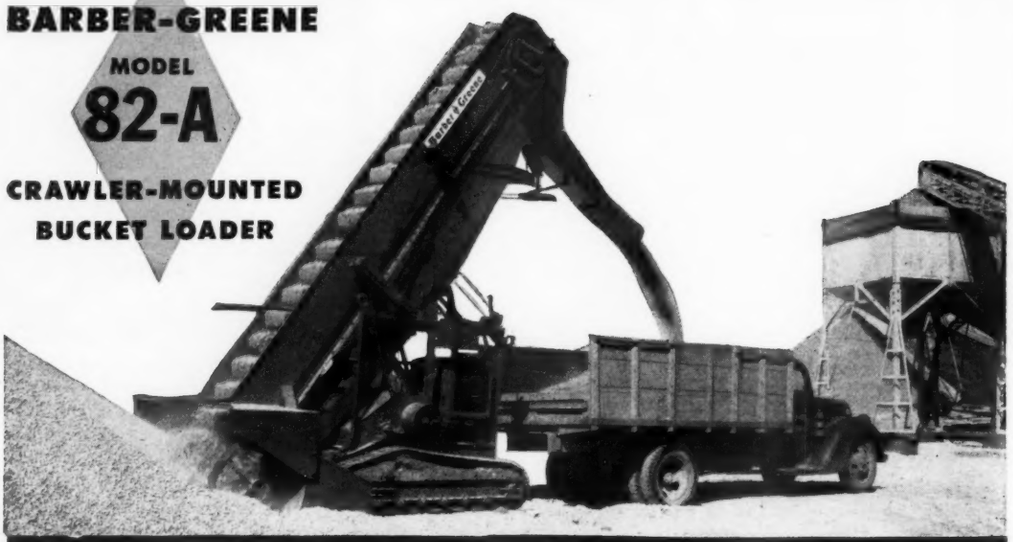

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A B-G 82-A Bucket Loader is by all odds the cheapest and fastest method of loading free-flowing materials into trucks. Exhaustive cost analyses made throughout Barber-Greene's over 30 years' experience (during which B-G Loaders handled over a billion yards of material) have consistently proved this.

Simple controls mean that each driver can load his own truck . . . no need for an expensive operator. Each truck can be loaded to full capacity without spillage . . . without truck damage or undue truck wear.

Crawler-mounted, the 82-A provides positive traction in all kinds of going—on soft or muddy bases—on spots where pneumatic-tired rigs can't operate.

Barber-Greene BG
Aurora, Illinois, U. S. A.

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18,500 GALLON CAPACITY

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THE SIMPLICITY VERTICAL TANK (with "Hot Well") keeps only enough asphalt heated to required temperature to supply the plant. The "inner well" is insulated by the larger quantity of asphalt at lower temperature in the "outer tank." This saves much in steam cost. Portable tanks from 20,000 to 100,000 gallon capacity.

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Highway Officials Ask For More Federal Aid

AFTER TWENTY YEARS of trying to persuade Congress to give up the federal gasoline tax (two cents per gallon) in favor of letting the states alone tax that commodity, the American Association of State Highway Officials changed that policy at its 39th annual meeting in Pittsburgh, Pa., November 10-13. Now the AASHO has decided to drop opposition to the federal gasoline tax, but wants Congress to appropriate more of the tax money for highways. Instead of the approximately $575,000,000 that the Federal government now turns back to the states every year, the highway officials recommended that $900,000,000 be the very minimum appropriation for federal aid. The policy statement proposes four authorizations for regular federal-aid funds on an annual basis: Interstate System, $250,000,000; Primary System, $292,500,000; Secondary System, $195,000,000; and Urban System, $162,500,000. It was further recommended that the federal-aid Primary, Secondary, and Urban allocations be distributed among the states on the existing 50-federal and 50-state basis.

As to the Interstate funds, the recommendation called for an apportionment on the basis of population of the states, with no state receiving less than three-fourths of one per cent of the appropriation. On this system the matching ratio would be on a 75-federal and 25-state basis.

While the new federal-aid policy was adopted by the convention, the 1,200 engineers and administrative officials heard an opposing view expressed by U. S. Senator Edward Martin of Pennsylvania. Senator Martin advocated withdrawal by the Federal government from the gasoline-tax field, leaving those revenues to the states. He also questioned whether federal participation in the development of roads should be continued, or whether it should be limited to research, coordination, and supervision. Engineering and construction, the Senator said, should be kept under control of the states.

Favoring a pay-as-you-go policy, Senator Martin declared, "We cannot make sound progress on borrowed money. I believe serious consideration should now be given to the expansion of the self-liquidating principle."

New officers elected for 1954 are: president—A. E. Johnson, chief engineer, Arkansas State Highway Commission; first vice president—George T. McCoy, state highway engineer, California Department of Public Works; vice presidents—first region—Frank D. Merrill, commissioner, New Hampshire State Highway Department; second region—Sam P. Turnbull, state highway engineer, Florida State Road Department; third region—Gale Moss, director of highways, Kansas State Highway Commission; fourth region—Mark U. Watrous, chief engineer, Colorado Department of Highways. George H. Henderson was re-elected treasurer.

The AASHO group will hold its 1954 annual meeting in Seattle, Wash.

The Gibbes spreader attachment in operation.

Crushed-Stone Spreader

■ A stone-spreader attachment that mounts on a dump truck tailgate is made by the Gibbes Machinery Co., Box 1020, Columbia, S. C. The attachment is made to spread crushed stone, gravel, slag, and similar material.

The Gibbes spreader consists of a metal box or hopper bolted to the rear of the truck body. The material flows by gravity and is controlled by a manually operated gate or shutter. The amount of the flow is not dependent upon the degree of body tilt.

For further information write to the company, or use the Request Card at page 18. Circle No. 457.

Pneumatic Vibrators

■ A catalog describing the line of pneumatic vibrators made by The Cleveland Vibrator Co., 2828 Clinton Ave., Cleveland 13, Ohio, includes metallic-impact and air-cushioned types. The latter operate with a minimum of noise. The company's line includes 29 mountings and 14 piston-diameter sizes, capable of producing a wide range of vibration intensities.

Catalog 109 also contains an engineering data sheet which can be filled out and returned for information and advice on vibrator requirements. A price list for the equipment is included.

To obtain this literature write to the company, or use the Request Card that is bound in at page 18. Circle No. 367.

Research Director for LeTourneau-Westinghouse

Named as director of engineering and research by LeTourneau-Westinghouse Co., Peoria, Ill., is W. W. Spannhake, mechanical engineer and consultant. Mr. Spannhake for the past five years has been associated with Barnes & Reinecke, Inc., a Chicago engineering firm, serving also as technical director of research and development activities for the organization. In his new position, Mr. Spannhake will be responsible for coordinating engineering functions involving products research, design, and development for the company, which is a wholly owned subsidiary of the Westinghouse Air Brake Co.

Caterpillar News

Roger T. Kelley, employee relations manager of Caterpillar Tractor Co.'s Milwaukee subsidiary, has been named labor relations manager of the main plant in Peoria. Mr. Kelley joined Trackson Co., a Caterpillar subsidiary, in 1946, and was promoted from assistant manager of the industrial relations department to manager a year and a half later.

Succeeding Mr. Kelley at the Milwaukee plant is Robert L. Sutton, former Trackson training manager.

Caterpillar will open its ninth parts depot on or about February 1, 1954. To be located on E. 39th St., Denver, Colo., the new depot will improve parts service for approximately 14 Caterpillar dealers in Colorado, New Mexico, Wyoming, Utah, Texas, and Montana.

The depot, with a staff of 25 persons, will carry a full stock of Caterpillar parts in a 40,000-square-foot building now under construction.

Yankee Baseball Star In Construction Field

Mickey Mantle, rising young star of the New York Yankees baseball team, is coming up in the construction world too. He has been named vice president of the recently organized Southwest Chat Co., Inc., Baxter Springs, Kans.

The corporation, formed by highway builder Harold D. Youngman, will specialize in railroad ballast, highway, and building aggregate. Mantle will direct the activities.

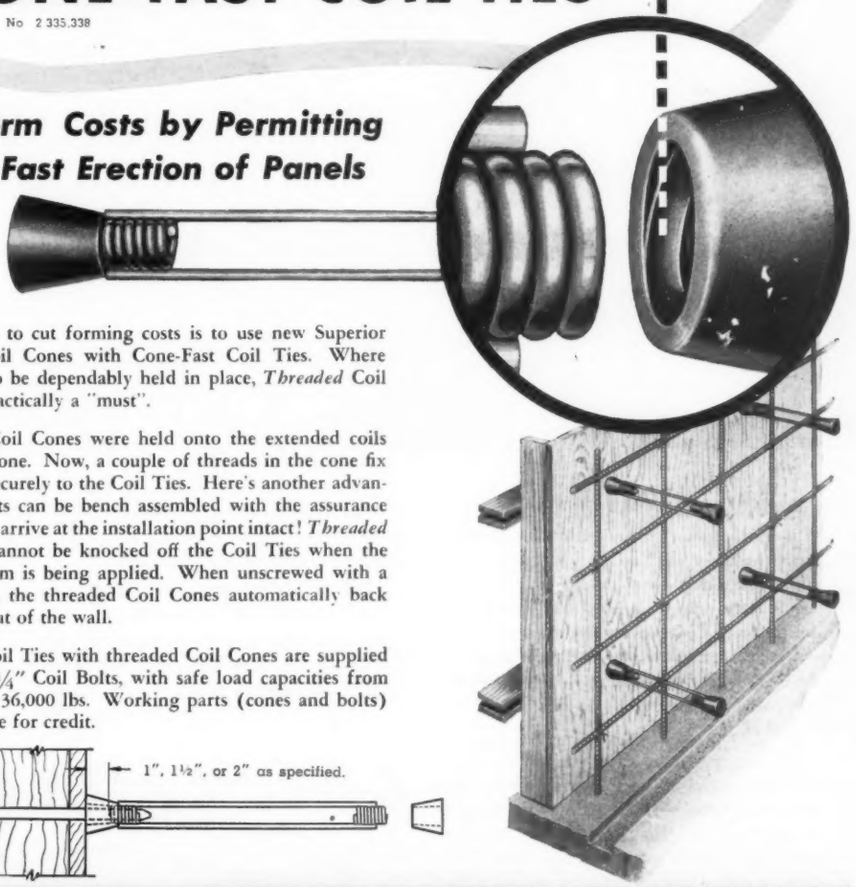
C. K. Underwood is president of the company and Youngman is chairman of the board of directors. Mantle worked on one of Youngman's road gangs last winter.

NEW!

THREADED CONES * for SUPERIOR CONE-FAST COIL TIES

Pat No 2 335 338

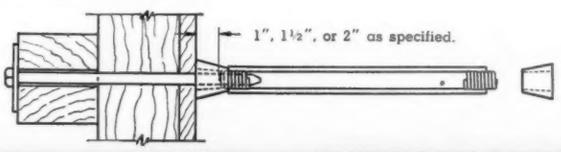
Cuts Form Costs by Permitting Extra Fast Erection of Panels



A direct way to cut forming costs is to use new Superior *Threaded* Coil Cones with Cone-Fast Coil Ties. Where cones have to be dependably held in place, *Threaded* Coil Cones are practically a "must".

Previously, Coil Cones were held onto the extended coils by friction alone. Now, a couple of threads in the cone fix Coil Cones securely to the Coil Ties. Here's another advantage . . . units can be bench assembled with the assurance that they will arrive at the installation point intact! *Threaded* Coil Cones cannot be knocked off the Coil Ties when the opposing form is being applied. When unscrewed with a cone wrench, the threaded Coil Cones automatically back themselves out of the wall.

Cone-Fast Coil Ties with threaded Coil Cones are supplied for ½" to 1¼" Coil Bolts, with safe load capacities from 5,000 lbs. to 36,000 lbs. Working parts (cones and bolts) are returnable for credit.



SUPERIOR CONCRETE ACCESSORIES, INC.

4110 Wrightwood Avenue, Chicago 39, Illinois

New York Office
1775 Broadway, New York 19, N. Y.

Pacific Coast Plant
2100 Williams St., San Leandro, Calif.

Glass-Wall School Nearing Completion

A NEW TYPE of wall construction using glass and site-fabricated porcelain-faced aluminum panels is being used in the building of a suburban junior high school in North Chicago, Ill. Basically, it consists of extensive use of glass set off by aluminum mullions and muntins.

The Engineering Construction Corp., Chicago, is general contractor for the project, which was designed by the architectural-engineering firm of Fisher & Bryant. The unusual wall construction was fabricated on the site by the National Glass Co.

Work started December 3, 1952. The administrative section and classrooms were completed for occupancy in September, 1953, for approximately 500 students. The balance of the job, including the cafeteria, gymnasium, and shop areas, should be finished this month, about six months ahead of a normal schedule for construction of this type. Estimated cost is $1,027,000.

Neal Junior High School will have a total area of about 13,000 square feet of aluminum-glass wall. The system is believed to be faster than conventional window construction and competitive in cost. It offers flexibility of design; walls are being constructed to withstand a pressure of 40 pounds per square foot after glazing.

The exposed metal area of the building will be reduced by 50 per cent as compared with conventional metal panels for exteriors. The innovation permits more natural light to reach the classrooms. Panels fabricated at the site of construction assure exact fittings and eliminate the waste of time and materials which occurs when prefabricated units must be returned to the shop for correction due to slight irregularities in floor and roof levels.

Before the erection of the aluminum-glass walls was started, the concrete floor was poured, the brick end walls were erected, and the concrete slab roof was poured. Then the aluminum sill, or bottom slip, was laid.

The sill does not actually rest on the concrete floor. It bears on lugs which are ram-set into the concrete. In this way, the perimeter strips, the sill, the side jambs, and the head are assured of being exactly level. The lugs supporting the strips can be shaved closely to correct slight variations normally encountered in concrete construction.

Twenty-foot strips of aluminum are used for the sills. Each is slipped over a lug and fastened into position. The side jambs are attached when the sill is laid. These are also positioned on ram-set lugs, which are set into the brick.

The head, or top strip, is attached next, positioned on lugs ram-set into the underside of the roof slab. On all of these perimeter strips, the face measures 1¾ x 5 inches.

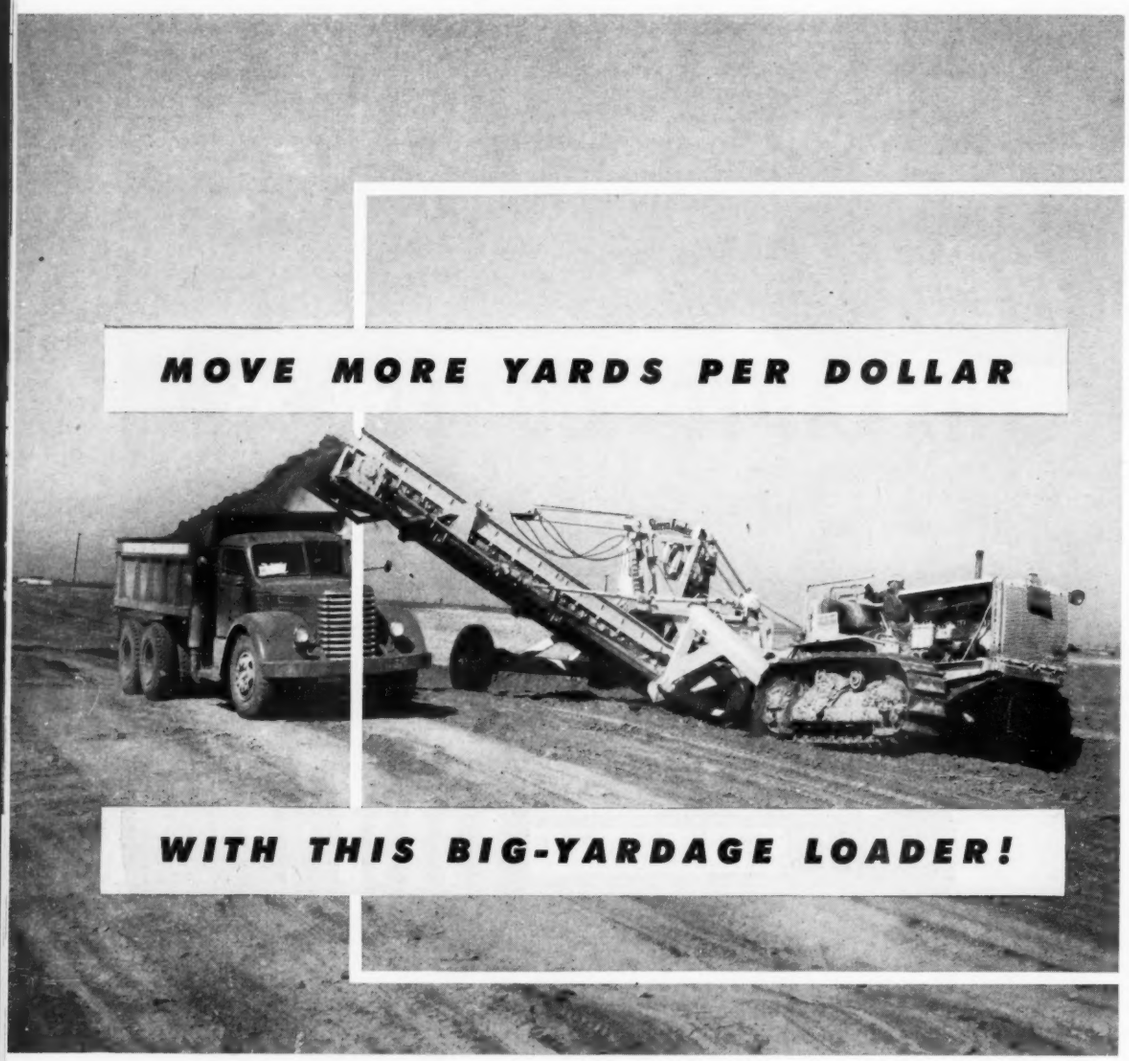
In setting the mullions, clip angles are fastened with blind cherry rivets to the sill and head. The mullions—vertical one-piece strips that reach from floor to ceiling—are set in place and riveted to the clip angles.

The clip angles are riveted to the sides of the mullions, and the muntins are placed and fastened with blind cherry rivets. Cut to the exact length of the glass they will hold, the structural function of the muntins is to support the mullions from the side, thus preventing "bowing".

The glass and porcelain panels are then installed. Integral stop construction is used to set the glass on the outside, to prevent leakage inside the classroom. Aluminum glass stops hold the glass in place. The stops, along with all removable strips of aluminum, are set with self-topping sheet metal screws.

The porcelain panels, which usually measure 2½ x 4 feet, are set in place in the same way as the glass panels. Backed with sheet aluminum, they are filled with foam glass for insulation. Used only on the bottom row, these panels mask the floor construction and cover the continuous convector heating system.

A simple type of mobile shop is used to turn out the panels. It consists of a radial saw bolted on a two-wheel trailer and powered by a 3-hp motor. The saw uses 14-inch soft steel blades especially designed to cut aluminum. Removable extension tables are fastened to the saw table to give increased working



THIS Cat*-powered Sierra Loader with D8 Tractor and single operator is working in a borrow pit on the Madera Irrigation Canal project for H. Earl Parker, Marysville, Calif. The hardpan's like rock—you have to rip all except the very surface, but this rugged rig is taking the rough going in stride. It keeps 25 trucks busy on a 3½-mile haul. Average load per truck—8 yards. Production per 8-hour day—2000 yards. Superintendent George L. White makes this comment: "We like our loader fine. It's really a dirt-moving machine."

With this big-capacity, one-man rig, you have a setup that cuts hours and dollars off earthmoving costs. The Sierra's 42" disc plow has a "slicing" action that assures fast cutting in tough material. Its 27-foot conveyor raises and lowers quickly at a touch of the control lever. Visibility is excellent, enabling the operator to maintain the right height for high- or low-side haulers for fast loading. All controls are handy to the operator's seat. And the rig has high maneuverability—a short turning radius makes it ideal for use in short or circular pits. Like all Caterpillar-powered equipment, the Sierra Loader, with its Cat D318 Engine, is built to stay on the job day after day with a minimum of down time.

Your Caterpillar Dealer, a reliable source of service and information, will be glad to give you complete facts about this money-saving loader. Ask him to show you how it can help you move more earth for less. Call him today for a demonstration!

Caterpillar Tractor Co., Peoria, Illinois.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

Above, a view of the north entrance to the Neal Junior High School in North Chicago, Ill. Doors and outward-opening windows were incorporated into the aluminum and glass design of the exterior. At right, more than 12,000 feet of Symons forms were used for the extensive concrete work on the irregularly shaped school building. Seven pours were required for the basement, each averaging about 85 cubic yards of concrete.

surface. These tables have adjustable legs to ensure a perfectly flat surface, considered vital in cutting aluminum.

The trailer is also equipped with a power takeoff and electric outlets so that power hand tools can be used. It is towed by either a car or a truck.

Concrete work was extensive on the irregularly shaped building. The general contractor used 12,000 square feet of Symons forms on the project, including 160 2 x 8-foot panels, 300 2 x 6-foot panels, 450 2 x 4-foot panels, 300 7-foot shores, and 100 36-inch column clamps. Fillers and corners were also used.

Foundation walls were put up in seven pours, averaging 85 yards per pour, using ready-mixed concrete. To save setting-up time, the Symons forms were waled at the top only for the 12½-foot-high basement walls. THE END

Data on Hydraulic Hoist

■ An illustrated bulletin showing complete specifications of the company's recently announced double-cylinder lightweight hydraulic hoist is available from the Heil Co., 3003 W. Montana Ave., Milwaukee 1, Wis. Features of the Model 2426 hoist are keyed to a picture of the unit.

The 50-degree dumping angle, low mounting height, the hoist frame, and other details are discussed. Capacity of the hoist is 3¼ to 6¼ tons for the conversion type and 4¼ to 5½ tons for the dump-body-mount type.

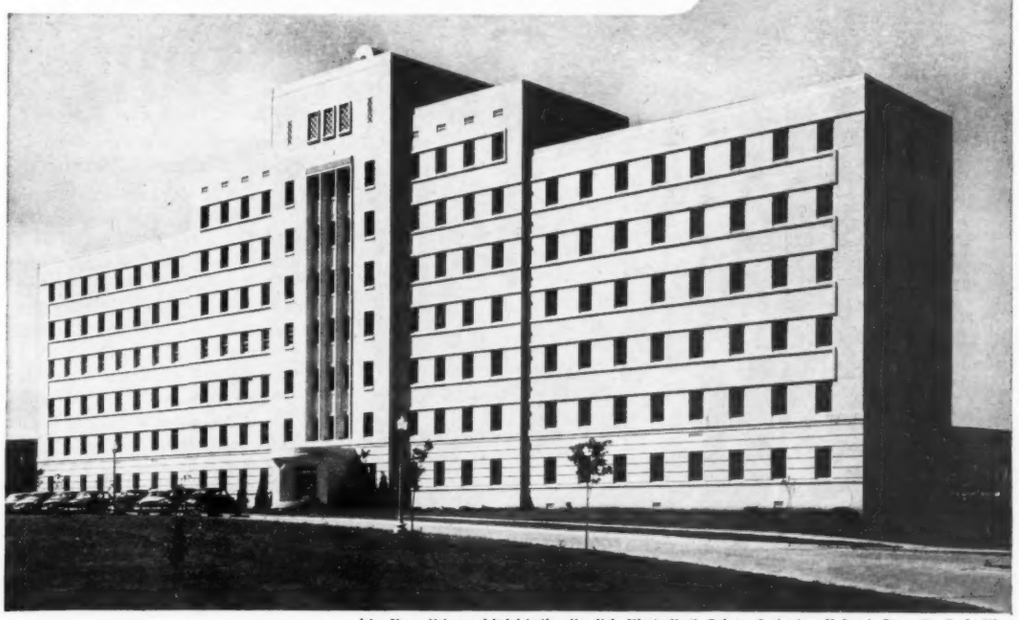
To obtain this literature write to the company, or use the Request Card that is bound in at page 18. Circle No. 425.

Schield Bantam News

R. A. Otterness, a veteran in the construction equipment industry, has been appointed manager of the northwestern district for Schield Bantam Co., Waverly, Iowa, manufacturer of power cranes and shovels. He will make his headquarters in Spokane, Wash.

Mr. Otterness will manage a territory including Idaho, Oregon, Washington, Montana; the provinces of British Columbia, Alberta, and Saskatchewan in Canada; and two distributor branches in Alaska.

VETERANS HOSPITAL USES ECONOMICAL FIREPROOF DESIGN



John Moses Veterans Administration Hospital, Minot, North Dakota. Contractor: McGough Bros., St. Paul, Minn.

Architectural concrete made with Duraplastic* does double duty

SERVING as structural material *and* facing, architectural concrete held down construction costs on this new government hospital. Naturally architectural concrete requires something extra in surface appearance. And that's one reason why contractor E. V. McGough used Duraplastic air-entraining portland cement. Well satisfied, he reports, "It gave us a very good finish... required less water and vibration."

Duraplastic cement imparts greater plasticity that aids proper placement of concrete... improves surface appearance.

It fills the bill on durability, too. Its air-entraining feature minimizes water gain and segregation. It requires less mixing water for a given slump and the finished concrete has increased resistance to freezing-thawing weather.

YET DURAPLASTIC COSTS NO MORE! More workability and durability are yours simply by specifying Duraplastic, the original air-entraining portland cement. It sells at the same price as regular cement and requires no unusual changes in procedure. Complies fully with ASTM and Federal Specifications. For free descriptive booklet, write Universal Atlas Cement Company (United States Steel Corporation Subsidiary), 100 Park Avenue, New York 17, N. Y.

OFFICES: *Albany, Birmingham, Boston, Chicago, Dayton, Kansas City, Minneapolis, New York, Philadelphia, Pittsburgh, St. Louis, Waco.*

**"Duraplastic" is the registered trade mark of the air-entraining portland cement manufactured by Universal Atlas Cement Company.*

ATLAS® DURAPLASTIC
AIR-ENTRAINING PORTLAND CEMENT

CE-D-151

Makes Better Concrete at No Extra Cost

UNITED STATES STEEL HOUR—Television alternate weeks—Consult your newspaper for date, time and station.

APPROVED for 1-course MACADAM

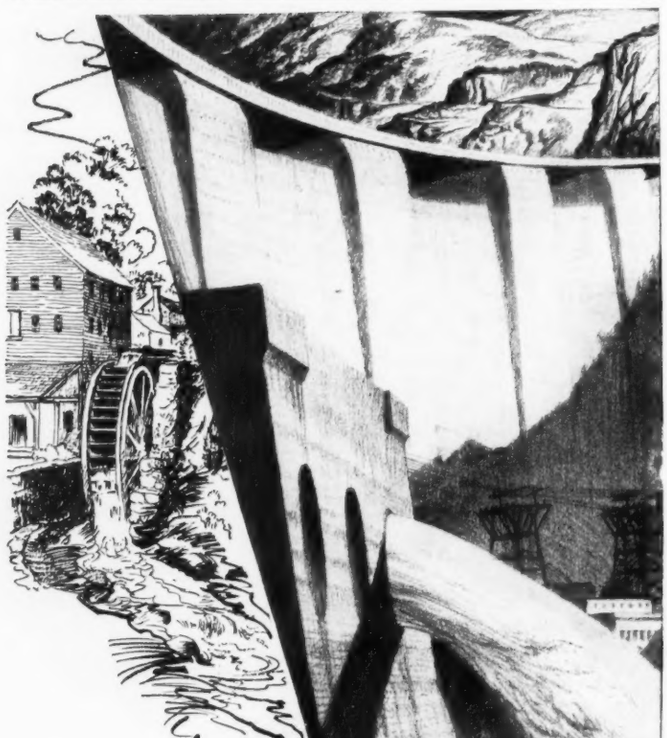
RUNWAY HIGHWAY **CONSTRUCTION**

The Vibro-Tamper applies vibration and impact, gives up to 95 proctor in 2 to 3 passes. Approved by many states and Army, Navy and CAA for 1-course construction.

In waterbound work, Vibro-Tamper "runs in" screenings in as few as 2 passes—saving 50% time on spreading, brooming, and rolling.

WRITE FOR VIBRO-TAMPER BULLETIN FOR COST-SAVING DETAILS

THE INTERNATIONAL VIBRATION COMPANY
16702 WATERLOO ROAD CLEVELAND 10, OHIO



More power by a dam site!

The early water-wheel converted a river's flow into mechanical power — usually enough for one small plant. Today, whole cities — even states — are supplied with *electric* power — and irrigating water, too — by gigantic dams, true monuments to the miraculous accomplishments of the modern construction industry.

Everywhere, members of that industry have found that the bonding facilities of the Ætna Casualty and Surety Company are unmatched — in scope of operations, in experience of personnel, in national reputation. You, too, will find that the Ætna is as dynamic and progressive as the industry it serves — its underwriting prompt, helpful, efficient. That is why so many contractors bond with *Ætna* — always.

No job too big--no job too small

ÆTNA CASUALTY AND SURETY COMPANY
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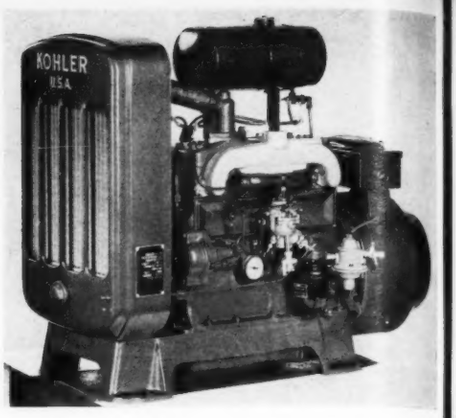

The Kohler Model 2M21, a 2-kw plant, equipped for kerosene-gasoline operation.

Electric Plants Use Kerosene and Gasoline

■ Kerosene-gasoline operation for all its 2-kw and 3.5-kw manually-started electric plants has been announced by the Kohler Co., Kohler, Wis. The new conversion unit includes a 1¼-gallon tank to provide gasoline for starting the L600 engine used in the plant. When normal operating speed and temperature are reached, a twist of a two-way valve transfers the fuel supply to kerosene. Before the engine is stopped, the valve is turned back to gasoline so that the kerosene in the carburetor and fuel lines can be cleared to permit easy starting for the next operation.

In order to effect this engine change, the manufacturer substituted a low-compression cylinder head and a special intake and exhaust manifold, and made modifications to the cylinder block and carburetor.

For further information write to the company, or use the Request Card that is bound in at page 18. Circle No. 370.

Calcium Chloride Manuals

The uses of calcium chloride in the construction of dense graded bases and wearing courses and as a treatment for abrasives used for snow and ice control are discussed in two illustrated booklets from the Calcium Chloride Institute, 909 Ring Bldg., Washington 6, D. C.

Manual SM-1, "Calcium Chloride for Stabilization of Bases and Wearing Courses", presents information as a guide for design and construction engineers, contractors, and materials suppliers. The booklet deals with properties and design, types and methods of construction, and specifications.

Manual IM-1, "Calcium Chloride for Ice Control", includes recommended procedures, treating and storage of abrasives, spreading methods, and the direct application of calcium chloride in ice control. Tables and charts give data on skid tests, the melting action of treated abrasives, and specifications.

Both manuals are available free on request to the institute at the address given above.

A. O. Smith Plant Opens

A new million dollar welding electrode plant at Lancaster, Pa., has been put into operation by A. O. Smith Corp., Milwaukee, Wis. The factory, occupying 41,000 square feet of floor space, has been designed without windows and skylights to insure better air control.

HOW TO SELECT A CLAMSHELL BUCKET

For best performance be sure to check

✔ Crane Capacity ✔ Work To Be Done
✔ Clearances ✔ Bucket Type and Size

Determine the *closing line pull*; also *size* of closing and holding cables. The *allowable gross load* is the closing line pull or the safe working gross load . . . *whichever is less.* • Consider *headroom clearance* and any other *space limitations* • Determine the *character of the material* to be handled or excavated • Then select the *type, size* and *weight* of bucket, and the proper *accessories* to make the bucket adaptable to your operations.

Blaw-Knox can best give you the engineering service that makes possible proper selection of the bucket suited for your needs.

BLAW-KNOX COMPANY
BLAW-KNOX EQUIPMENT DIVISION
2001 Farmers Bank Building • Pittsburgh 22, Pa.

BLAW-KNOX CLAMSHELL BUCKETS
The Most Complete Range of Sizes and Types

Truck Service Bodies

■ Standard service bodies for installation on ½, ¾, and 1-ton truck chassis and construction units for 1½-ton and larger chassis are made by the Utility Body Co., 1530 Wood St., Oakland 7, Calif.

The Model S-48 service body features a 48-inch bed width and is available with optional sliding cover and end-gate enclosure. The body has an anti-buckling heavy-duty corrugated-steel floor with drainage outlets. Top panels are ribbed for added strength. Side-angle or overhead-type ladder racks are available optionally.

The Utility Model S-48 service body for light chassis.

Model S-48 has a body length of 90 inches. Other units are made in 104 and 75-inch lengths. The company also produces the Series E, larger enclosed superstructure bodies, and the Series U compartments for converting pickup trucks into service bodies. Also available are crew-cab bodies, as well as a complete line of optional equipment.

For further information write to the company, or use the Request Card that is bound in at page 18. Circle No. 360.

In 1915, an earthquake caused a Nevada mountain to grow thirty feet.

DISTRIBUTORS

ALABAMA—Tractor & Equipment Co., Inc., 4402 First Ave. N., Birmingham 1; 809 Church St., Decatur. Ray-Brooks Machinery Co., 2375 W. Fairview Ave., Montgomery; P. O. Box 237, Mobile.

ALASKA—Western Tractor & Equipment Co., Box 2832, Anchorage; Box 407, Fairbanks.

ARIZONA—State Tractor & Equipment Co., 627 S. 17th Ave. Phoenix. Lively Equipment Co., Albuquerque, N. M.

ARKANSAS—Euclid-Arkansas, Inc., 702 W. Second St., North Little Rock.

CALIFORNIA—Geo. H. Philpott Co., Inc., 1050 Bryant St., San Francisco; 339 W. Maple St., Monrovia.

CANADA—Dietrich Collins Equipment Ltd., 860 S. W. Marine Dr., Vancouver 14, B. C. Ferguson Supply Alberta Ltd., Calgary, Edmonton and Lethbridge, Alberta.
R. H. Godsell Equipment Ltd., 98 Joshua Ave., Toronto; P. O. Box 187, Port Arthur, Ontario; P. O. Box 69 NDB., Montreal, Que. Maritime Newfoundland Agencies Ltd., P. O. Box 822, Halifax, N. S.

COLORADO—Colorado Builders' Supply Co., 1300 West Evans Ave., Denver.

CONNECTICUT—The W. I. Clark Co., 2195 Dixwell Ave., New Haven.

DELAWARE—L. B. Smith, Inc., Camp Hill, Penna.

FLORIDA—Florida-Georgia Tractor Co., 2806 W. Beaver St., Jacksonville; 2419 State Rd., Lakeland; 3139 No. Miami Ave., Miami; 1400 S. Orange Blossom Trail, Orlando; New Quincy Highway, Tallahassee; 216 S. 12th St., Tampa.

GEORGIA—Tri-State, Inc., 830 Glenwood Ave. S.E., Atlanta 1; East Side Highway, Mount Olive Rd., Augusta; 712-14 No. Washington St., Albany.

HAWAII—Grace Brothers, Ltd., 770 Ala Moana Road, Honolulu 10, Hawaii.

IDAHO—Intermountain Equipment Co., Broadway at Myrtle St., Boise; 210 No. 4th St., Pocatello.

ILLINOIS—Gil Speers Equipment Co., 7525 South Kedzie Ave., Chicago 29.
Euclid Sales & Service, Inc., St. Louis 10, Mo.

INDIANA—Reid-Holcomb Co., 1915 Kentucky Ave., Indianapolis 21. Gil Speers Equipment Co., Chicago 29.

IOWA—Herman H. Brown Co., Des Moines, Cedar Rapids and Sioux City.
Peirs Tractor & Equipment Co., Omaha 2, Neb.

KANSAS—The G. W. Van Keppel Co., Kansas City 9.

KENTUCKY—Euclid-Kentucky, Inc., 3000 Crittenden Drive, Louisville.

LOUISIANA—Euclid-Memphis Sales, Inc., Memphis 2.

MAINE—N. A. Burkitt, Inc., Route 1, R.F.D. 2, South Portland.

MARYLAND—Rish Equipment Co., Clarksburg, W. Va.
L. B. Smith, Inc., Camp Hill, Penna.

MASSACHUSETTS—Clark-Wilcox Co., 116 Western Ave., Boston 34.
The W. I. Clark Co., New Haven, Connecticut.

MICHIGAN—W. H. Anderson Co., Inc., 47 West Seven Mile Rd., Detroit 3.
The Euclid Road Machinery Co., Hibbing, Minn.

MINNESOTA—The Euclid Road Machinery Co., Highway 169 West, Hibbing.

MISSISSIPPI—Euclid-Memphis Sales, Inc., Memphis 2.

MISSOURI—Euclid Sales & Service, Inc., 5231 Manchester Ave., St. Louis 10.
The G. W. Van Keppel Co., 2401 Pennway, Kansas City 8.

MONTANA—Hall-Perry Machinery Co., P. O. Box 1207, Butte.

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NORTH CAROLINA—North Carolina Equipment Co., P. O. Box 880, Greenville; P. O. Box 1205, Charlotte; Swanton Creek Rd., Asheville; P. O. Box 138, Guilford; P. O. Box 985, Wilmington.
Hampton Roads Tractor & Equipment Co., Norfolk, Virginia.

NORTH DAKOTA—Northwestern Equip. Co., Box 182, Fargo.
Northwestern Equip. Co. of Minot, Box 338, Minot.

OHIO—The W. W. Williams Co., 838 Goodale Blvd., Columbus 8; 18301 Brookpark Rd., Cleveland 11; 914 Main St., Cincinnati 15; 1300 Conant St., Toledo (Maumee).

OKLAHOMA—Butler-Sparks Equipment Company, Oklahoma City and Tulsa.

OREGON—Intermountain Equipment Co., Boise, Idaho.
P. L. Crooks & Co., 2145 N.W. Pettygrove St., Portland.

PENNSYLVANIA—Atlas Equipment Corp., 636 Ridge Ave., Pittsburgh 12.
Standard Equipment Co., 152 Horton St., Wilkes-Barre; Hepburn & Lycoming Sts., Williamsport.
L. B. Smith, Inc., Camp Hill (Harrisburg); 29th & Montgomery Avenue, Philadelphia.

RHODE ISLAND—Clark-Wilcox Co., 2323 Pawtucket St., E. Providence.

SOUTH CAROLINA—Southern Equipment Sales Co., Sumter Highway, Columbia.

SOUTH DAKOTA—The Euclid Road Machinery Co., Hibbing, Minnesota.

TENNESSEE—Euclid-Memphis Sales, Inc., 185 E. Butler Ave., Memphis 2.
Power Equipment Co., 1218 Island Home Ave., Knoxville; 600 W. Manning St., Chattanooga; 121 Clay St., Kingsport.

TEXAS—The Euclid Road Machinery Co., 1007 Lovers St., Dallas 2.
Lively Equipment Co., P. O. Box 1438, El Paso.

UTAH—Foulger Equipment Co., 1301 So. 2nd West, Salt Lake City 8.

VERMONT—Clark-Wilcox Co., Boston 34, Mass.

VIRGINIA—Hampton Roads Tractor & Equipment Co., W. 30th and Killam Ave., Norfolk.
Rish Equipment Co., 1601 Chamberlayne Ave., Richmond 10; 405 Center Ave. N.W., Roanoke 7.

WASHINGTON—Western Tractor & Equipment Co., 2330 First Ave., S., Seattle 4; 905 Prindle St., Chehalis; Rt. 12, Box 94, Yakima.
Intermountain Equipment Co., E. 811 Sprague Ave., Spokane 2.
P. L. Crooks & Co., Portland, Oregon.

WEST VIRGINIA—Atlas Equipment Corp., Pittsburgh.
Rish Equipment Co., Kanawha Blvd., Charleston 25; East on U.S. 60, Clarksburg; P.O. Box 259, Bluefield.
L. B. Smith, Inc., Philadelphia, Penna.

WISCONSIN—Cunningham-Ortmayer Company, Milwaukee 46, Eau Claire and Green Bay.

WYOMING—Colorado Builders' Supply Co., Denver.
Foulger Equipment Co., Salt Lake City 8, Utah.

"Eucs" SURE DO THE JOB!

Euclid Scrapers—12, 15.5 and 18 cu. yds. struck...190 to 400 h.p. engines... top speeds, loaded to 30 m.p.h.

Bottom-Dump Euclids—13, 17 and 25 cu. yds.... 190 to 300 h.p...top speeds loaded to 35 m.p.h.

Rear-Dump "Eucs"—10, 15, 22, 34 and 50 tons ...125 to 600 h.p...spring mounted or semi-rigid drive axles...top speeds loaded to 36 m.p.h.

On construction and mining jobs the world over you'll hear owners say, "those 'Eucs' make more money for us and do more work than any equipment we've ever used." Operators, too, like "Eucs" because they're easy to handle and have plenty of what it takes to haul and dump big loads in tough going.

There are lots of reasons why men who know earth moving equipment specify Euclids, but they all add up to one simple fact . . . "Eucs" move more loads per hour at the lowest cost per ton or yard of material moved. Profitable performance on all types of work is proved by the fact that over 60% of all Euclid equipment sold is repeat business from satisfied users.

When competitors are using "Eucs" to move dirt or rock faster and cheaper than you are, you can't afford to pass up the cost cutting advantages you get in Euclid equipment. For the recommendations of a hauling equipment specialist and a production and cost estimate on your job, get in touch with your Euclid distributor . . . there's no cost or the slightest obligation.

The EUCLID ROAD MACHINERY Co., Cleveland 17, Ohio

EUCLID (GREAT BRITAIN) LTD. • GLASGOW, SCOTLAND

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

Material for the fills is loaded into a Euclid scraper with the aid of an International TD-24 pusher.

Caterpillar D7 with a Trackson side boom rolls the side of the canal before spraying with asphalt.

Lateral Canal Lined With Asphaltic Membrane

Catalytically blown sealer is used on 5 miles of canal in porous rock section for protection against leakage

By RAY DAY

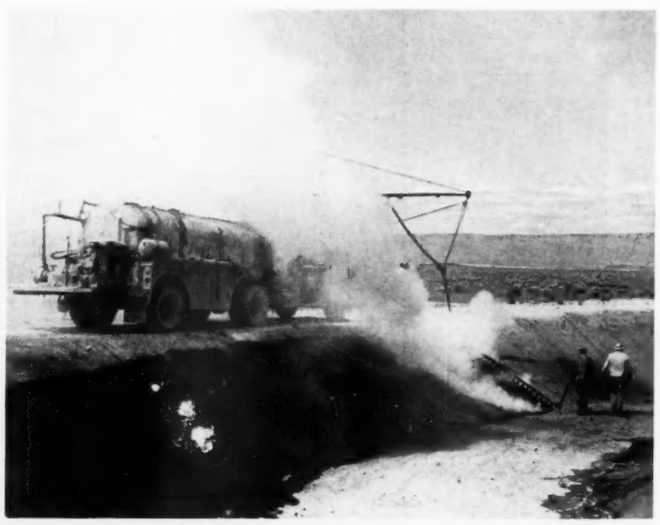
A VERY LARGE working area, a shortage of available water, and quick-changing ground formations, including a 5-mile stretch of porous rock near the center of the project, were some of the main problems encountered in a 63-mile lateral canal job south of Quincy, Wash. The construction is part of a water distribution network being built to provide the arid land of the Columbia Basin with water from the Columbia River.

The job was done for the U. S. Bureau of Reclamation by a joint-venture firm composed of the Cherf Bros. Construction Co. and Sandkay Contractors, Inc., both of Ephrata, Wash. This $1,250,000 group of canals in the W-6A irrigation area was completed before the November 1 deadline.

Ditch sizes under the contract varied from a minimum bottom width of 2 feet to a maximum of 17 feet. Side slopes were 1.75 to 1 throughout. There were a few cuts as deep as 18 feet and a considerable number of fills. Dirt work amounted to 460,000 cubic yards of common excavation, 60,000 cubic yards of intermediate excavation, and 200,000 cubic yards of borrow material.

Catalytically blown asphaltic membrane lining was used in a 5-mile section of canal through porous rock. This was specified to prevent leakage. The lining is expected to do a more economical job than would be possible with conventional portland-cement concrete lining.

The lateral systems are a part of the master water distribution plan and are spread out, so that water enters from the west canal and distributes over as wide an irrigation area as possible. The problem of



Asphaltic membrane is sprayed on the canal slope from a 2,800-gallon GMC-mounted distributor unit equipped with a 12-foot spraybar. The Shell asphalt was loaded at the refinery at temperatures of from 450 to 460 degrees.

Workmen are very careful not to leave exposed surfaces around a water outlet when applying the asphaltic membrane.

When the sides are completed, asphaltic membrane is applied along the bottom with a hand-held spraybar.

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coordination of activities over the expanse of work was solved through the use of three Motorola two-way mobile transmitters, located in the cars of the project manager, the excavation superintendent, and the structure superintendents.

Tough Digging

The area involved in the job contains some of the toughest excavation in the Columbia Basin. There are long reaches of caliche and large sections composed of gravel and boulders. Of course, there are also easier soils, such as sand and silt, much of it powder dry and fine-textured.

More than half the lateral system rests in earthen fills built up with this material, compacted and finished as to slope and bottom. The hardest digging job—a battle with imbedded rock—was handled by a one-yard Lorain dragline with an Esco bucket on the end of a 60-foot boom. This machine excavated the coarse gravel and boulder sections of areas too tough for tractor equipment. The general plan was to dig the canal and cast the excavated material to both sides of the ditch in equal spoil piles.

Even though the digging was brutal, this part of the spread had been bid as a common excavation item, because no drilling or blasting was indicated. The dragline encountered several places where the ditch had to be excavated in two stages instead of one. In certain places, a pair of International TD-24's, handling a single-tooth LeTourneau K-30 Rooter, had to break up the formation—particularly in caliche—ahead of the dragline bucket.

Formations had a tendency to change suddenly. A machine might be battling hard rock for a week only to run into sand in the middle of a shift. The opposite was often true; formations would change from easy sand digging to hard rock in a matter of minutes.

Dirt-Hauling

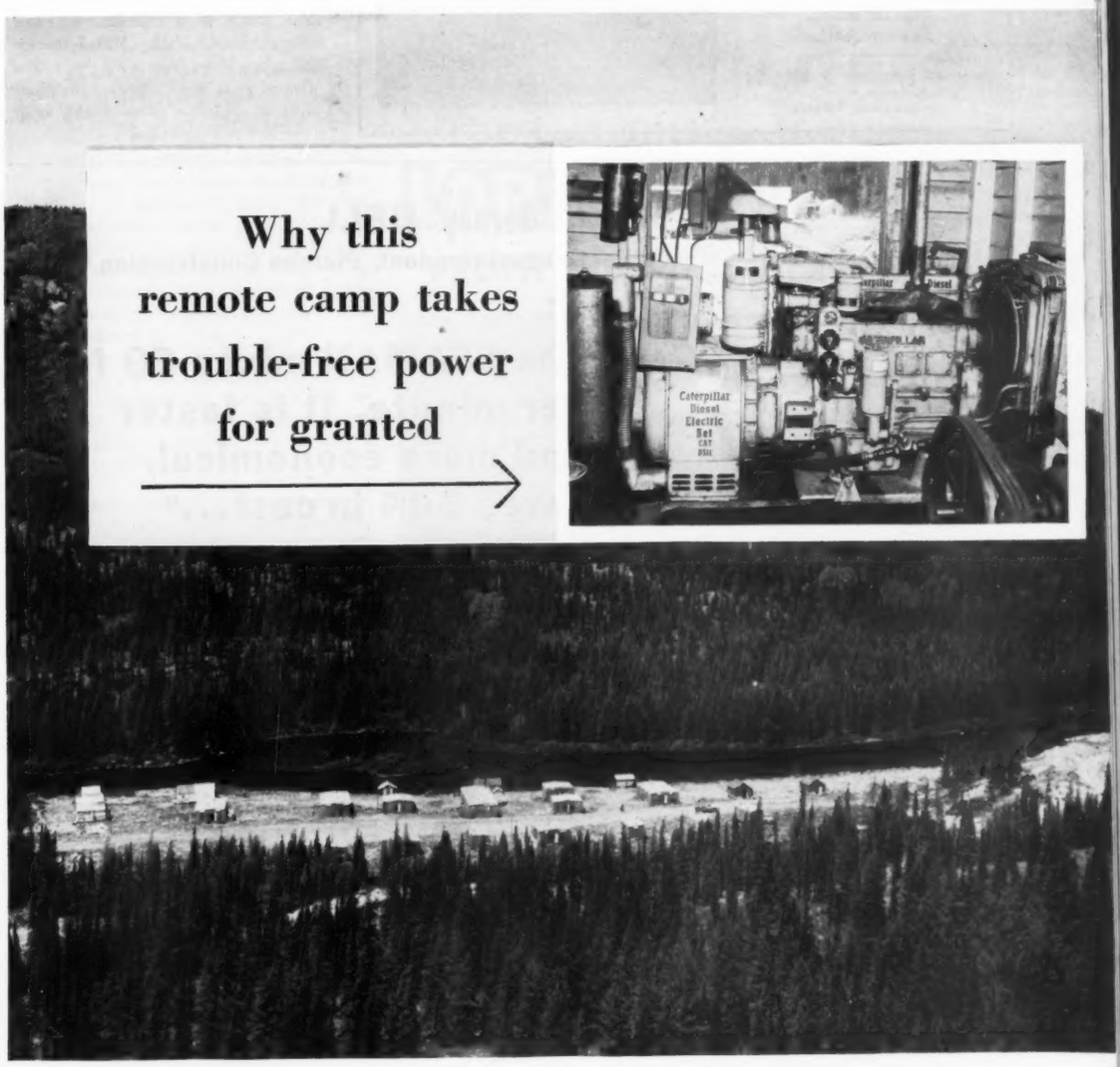
On the easier work, where excavation was being done on hauls more than a half mile long, three single-powered Euclid scrapers picked up the dirt from borrow areas and carried it to its place of disposal in fills. These units received loading assistance from an International TD-24 pusher tractor in the pit. On hauls less than a half mile long, three LeTourneau D-Roadsters were used. They were also dependent on a TD-24 pusher tractor for their heaping loads.

Earth fill in built-up canal sections was compacted to the 95 per cent density called for in the contract. Water, which was scarce, had to be obtained from a nearby farmer. Arrangements were made to use his well and deep-turbine pump to supply the contractor's reservoir. A 5,000-gallon water tank on an International L-190 truck, two 2,000-gallon tanks on army-type 6 x 6's, and several smaller tank trucks made up the water-hauling fleet. These machines were working at full speed 90 per cent of the time.

The moistened earth fill was processed in layers generally less than 6 inches thick. A two-section sheepsfoot roller, working behind an

(Continued on next page)

An Allis-Chalmers HD-5 tows a pair of Bros sheepsfoot rollers over part of the built-up section. At the right, a LeTourneau D Roadster approaches with a load of dirt from one of the closer borrow areas.



Everything from food and clothing to lumber and Diesel fuel is flown into Camp 66. This is one of the line camps set up by C.M.M.K. to house workers on the 360-mile railroad construction job for Iron Ore Co. of Canada between Seven Islands, Quebec, and Knob Lake, Labrador. Power could be a problem here, but it isn't. A Cat* D311 Electric Set provides electricity for all lights and pumping the water supply.

There are many advantages in using Caterpillar Diesel Electric Sets in remote places. You can take their dependability for granted—it's engineered and built into every part for long life. They're rugged, too. They stand up under the buffeting of transportation. They're easy to install and operate. And they don't require costly, high-grade fuel. They burn low-cost No. 2 furnace oil without fouling. That means cheaper fuel and *less* of it to haul, as well as a minimum of maintenance!

Are you figuring on electric power? You can save yourself trouble and money with Caterpillar Electric Sets. Engines and electric sets are available in 12 sizes up to 500 HP and 315 KW. Your Caterpillar Dealer backs them up with *fast* service. Call him today—ask him to *show* you proof of dependable performance!

Caterpillar Tractor Co., Peoria, Illinois.

CATERPILLAR*

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WE'VE MADE CLAIMS...
NOW MAKE US
PROVE THEM

Lateral Canal Lined With Asphaltic Membrane

(Continued from preceding page)

Allis-Chalmers HD-5 crawler tractor, cooperated with the hauling units to compact the earth. The passage of loaded Tournapulls and "Eucs" also helped in the compaction.

After the rough excavation had been completed by the dragline and a rough canal established by compacting embankments, a great deal of shaping work still remained to make a canal suitable for water. The 1.75 to 1 side slopes had to be dressed carefully and, in sections where asphaltic membrane lining was called for, all the large rocks had to be removed.

A Caterpillar No. 12 motor grader was rigged up with a set of bolts in its moldboard, leading down along the canal slope. A special sloping cutter, made from a discarded scraper blade, was attached to the set of bolts. By traveling along the top of the canal berm with its blade level, the motor grader could finish the slopes to exact grade.

In especially rocky sections, where asphalt lining was contemplated, the machine dragged a set of discarded Cat tracks to loosen all the oversized rock. These rolled down to the toe. They were bunched together by an Allis-Chalmers HD-5 tractor and a one-yard Tracto-Shovel. The piles of rock were then left in place until a dragline came along later to put in the silt lining. At that time, it scooped the rocks out of the canal.

The prime contractor combine assumed responsibility for all excavating and finishing. From that point on, the business of dragging, rolling, and placing the asphalt membrane was a job for the subcontractor, the L. W. Vail Co., Pasco, Wash.

Asphalt Membrane Lining

The application of catalytically blown asphalt membrane in five miles of porous rock formations was expected to create a watertight skin approximately ¼ inch thick. Bureau of Reclamation studies on other canals, notably those in Wyoming, have indicated that asphalt membranes tend to bridge over and break under water pressure if large rocks are left in the canal sides. For this reason, all large rocks were being removed by the dragged Cat track and front-end loader method. In addition, a silt blanket 4 inches thick was required over parts of the natural material. This silt was then compacted to form a smooth, dense surface on which the asphalt membrane would rest.

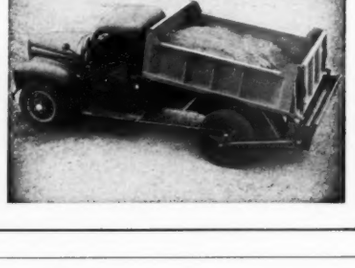
The silt blanket was placed by a ½-yard Link Belt Speeder truck crane, whose boom was sufficiently long to reach out on both sides and borrow material as needed. The topsoil through all the rocky material was a very fine, shallow silt. After the silt blanket was in, it was smoothed down by a small tractor and a weighted wire-mesh drag. Considerable hand raking also was necessary.

When the silt blanket was smooth, a Caterpillar D7 tractor and Trackson side boom moved in with a steel-wheel roller. The roller was supported from the side boom by cable. This rig rolled the silt blanket to make it dense and smooth. At the same time, moisture was added from a sprinkling truck to keep the silt in that good condition.

The catalytically blown asphaltic material was produced on special order by the Shell Oil Co. refinery in Portland, Oreg., and was trucked to the site. The asphalt was loaded at the refinery at from 450 to 460 degrees F—higher than placing temperature—so that it could arrive at the site at handling temperature.

When the asphalt arrived on the job, it was transferred to a 2,800-gallon GMC-mounted special distributor unit. Under pressure, this machine sprayed the material on the canal through a 12-foot distributor bar with 3/16-inch snivvies. Pressure was generated by a 3-inch Viking asphalt pump, driven by a Ford V-8 engine, mounted on the

Use Swenson self-feeding material spreaders for fast, easy application of salt, chloride, sand, cinders, gravel or a combination of these materials



Free Information

Swenson Spreader & Mfg. Co.

Lindenwood, Illinois

W. G. "Barney" BELL

Project Superintendent, Piombo Construction Co.

SAYS:

" The SEAMAN mixes 50 feet per minute. It is faster and more economical, saves 50% in cost..."

SEAMAN Trav-L-Plant pumps water from truck, applies thru the spray bar directly into the mix.

AUXILIARY SPRAY BAR APPLIES BINDER AT MOST EFFICIENT MIXING POINT
WIPING AND MOPPING ACTION OF TINES BLOTS UP DUST AND DISPERSES IT UNIFORMLY THROUGH MIXTURE
DUST FILM ON BASE

They're using a SEAMAN Self-Propelled Trav-L-Plant on the big Bayshore Freeway widening project in Mateo County, Cal. — and as Mr. Bell, the project superintendent for Piombo Construction Co. attests — "The SEAMAN saves 50% in cost."

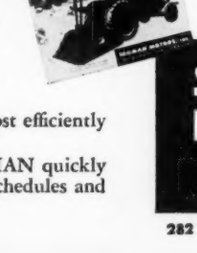
That's a lot of money when you consider that the total construction will run $1,700,000!

In constructing the cement-treated base, the SEAMAN is pulverizing, mixing and placing the materials for maximum density — partially pre-compacted for finished rolling. The SEAMAN maintains accurate depth control and by proper blending and placement corrects segregated material.

The SEAMAN Trav-L-Plant applies the water in processing. This is pumped from a tank truck operating just ahead and applied with a spray bar directly into the mixing chamber. In consequence the water is under complete control and is mixed instantly and thoroughly with virtually no evaporation loss.

That's the facility a SEAMAN Trav-L-Plant provides you — any fluid binder, water, asphalts, tars or emulsions are applied at the point where they are mixed most efficiently and quickly — with no run-off or migration.

In every in-place mixing job, large or small, the SEAMAN quickly repays its investment in lower cost, faster production schedules and far greater versatility in the types of work it does.



Spray bar applies any fluid binder instantly and accurately into the mixing chamber, provides complete control of uniformity and avoids loss of bitumen by migration or water by evaporation.

Send for the new Bulletin completely describing the SEAMAN Self-Propelled Trav-L-Plant and the SEAMAN Self-Propelled Pulvi-Mixer. Shows many job scenes; fully describes mixing method. Write for Bulletin TSP.

SEAMAN MOTORS Inc.

282 N. 25th St. • Milwaukee, Wis.

DRILLING CONTRACTORS

Diamond and Shot Core Borings, Dry Sample Borings, Grout Holes and Pressure Grouting, Foundation Testing for Bridges, Dams and all Heavy Structures

Manufacturers, also, of Diamond Core Drilling Machines and complete accessory equipment, including all types of Diamond Drilling Bits.

Write for Catalog No. 320

SPRAGUE & HENWOOD, INC.

Dept. C, Scranton 2, Pa.

back of the distributor unit. On peak occasions, the distributor applied up to 16,000 gallons of asphalt in an 11-hour shift.

Membrane Application

The membrane was applied on one bank at a time. The last operation was to join the two sides by spraying the bottom. Sides were applied by the truck-suspended distributor bar, but the bottom section was covered by a hand-held distributor bar. A crew of four men tended the distributor unit. They became so proficient that they were able to empty a 2,800-gallon load in 30 minutes on an exceptionally good run.

After the asphalt membrane was in, 12 inches of select granular blanket material was cast to the canal bottom by a Lorain one-yard dragline, which had also done the rock excavation. Twelve inches of the same material was then added to each slope. This material was dressed down smooth with the wire-mesh drag. A 4-inch step was cut out of the top portion by the No. 12 motor grader and the slope blade. A select gravel blanket, about 4 inches thick, was placed from this step to the top of the canal by the motor grader. Called "beach line" rock, this material rounded out the canal lining. The granular blanket and select rock will protect the asphalt membrane from damage by water, cattle, or heat.

Personnel

The project was directed for the Bureau of Reclamation by the Ephrata construction office, which is headed by L. V. Downs, supervising engineer. A. F. Swanson was resident engineer, Herman Neibauer was construction engineer, and Joseph Kirk was field engineer.

Contractor forces were headed by Al Hamlett, project manager, with L. J. Curtis as excavation superintendent, Al Pauli and Jim Malone on structure construction, Vern Haisch as assistant excavation superintendent, Jerry Lingel as office manager, and William Shimasaki as project engineer.

The over-all contract operation was also under the supervision of Roy Johnson, co-owner of Sandkay Contractors. THE END

Marlow Pumps Merges With Bell & Gossett

Marlow Pumps, Ridgewood, N. J., manufacturer of self-priming centrifugal pumps, has been merged with the Bell & Gosset Co., Morton Grove, Ill., manufacturer of hot water circulating pumps, universal pumps, heat exchangers, flow control valves, and other heating specialties. It will now be known as the Marlow Division of Bell & Gossett.

Marlow Pumps, with its main plant in Ridgewood and a branch plant in De Queen, Ark., as well as licensed plants in France and England, will continue its present line under the Marlow name. Additional production capacity will be added in the east to manufacture Bell & Gossett products. Both product lines retain their individual identities.

Conventions are listed on page 84.

U. S. Firms To Head Work On Our Bases in Spain

A minimum of American and a maximum of Spanish personnel will be used in the architectural, engineering, and building functions connected with the construction and improvement of U. S. air and naval facilities in Spain. A large part of the work will be subcontracted to Spanish companies, while administrative control of the jobs will remain with American firms.

A joint-venture concern made up of four organizations has been selected by a U. S. Navy-Air Force board to handle the job. The firms are Shaw Metz & Dolio, Chicago, Ill.; Frederic R. Harris, Inc., New York City; Pereira & Luckman, Los Angeles, Calif.; and Metcalf & Eddy, Boston, Mass.

The project will be controlled by a policy committee made up of one representative from each of the joint-venture firms. Through an agreement between the secretaries of the Navy and the Air Force, the Navy's Bureau of Yards and Docks has been assigned direct responsibility for the entire construction and improvement program.

Work on the multimillion dollar project is expected to start following a meeting in Spain of representatives of the Air Force and Navy who will initiate the required technical planning. The project will require about two years to complete.

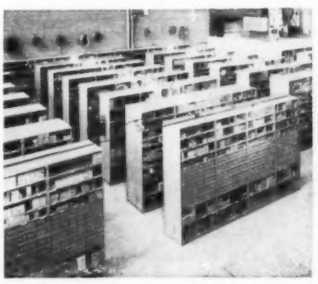
Under the agreement with Spain, the port bases of Cadiz on the Atlantic and Cartagena on the Mediterranean will be improved. They will serve both as naval stations and supply-handling ports for inland airfields. Eight air bases will also be enlarged and improved to handle modern air material, probably at the following locations: Madrid, Sevilla, Barcelona, Albacete, Valencia, Ciudad Real, Zaragoza, and the island of Minorca.

(Advertisement)

Construction Equipment Distributor Helps User to Bigger Profits

The construction equipment distributor has played an important part in helping to build the vast construction industry as we know it today. Too often the services of the distributor are taken for granted, but these services have much bearing on the contractor's profit and success.

The role of the distributor begins when a job is bid. He provides facts and figures on a moment's call on most any equipment. He stocks machines for prompt delivery. He knows job conditions within his territory



Parts-in-stock — a time-saving, cost-cutting Distributor service.

and helps in applying proper equipment for lowest operating cost. When a sale is made, he arranges the financial plan. Many a contractor has been given his start and guided down the path to prosperity by an intelligent and helpful distributor.

When the equipment goes to work, his role becomes increasingly important. The distributor's parts and service facilities can often mean the difference between profit and loss to the contractor. Genuine parts stocks are close to the job. Shop facilities are specialized for equipment service. Field service on-the-job adds countless hours of performance time. Distributor parts and service personnel bring factory approved methods to the equipment owner for lower costs and best results. Machine records are maintained to further speed customer service.

When you think of your equipment distributor, consider all of the things he offers to make the contractor's work more profitable. He is not only a selling agent, but an organization of specialists very closely geared to every phase of a construction project. Without the construction equipment distributor, the present day contracting industry as we know it could hardly exist. Hats off to one of the industry's most important groups!

LOOK AT THESE
LORAIN-50
PROFIT BOOSTERS

HYDRAULIC COUPLING — Prevents shocks and stresses from backing up into mechanism and cables—reduces maintenance—increases output. No stall under any digging condition. Standard on only this 1-yard machine.

AIR CONTROLS — Air does the work on the "50" — crawler steering and Tread-Travel Lock use full air power. Air-assist available on hoist, crowd and retract.

4 CRAWLERS — Be "choosy" about your crawler. Select from standard, long, extra-long, and extra-long & extra-wide —to exactly fit your job. Rubber-tire mountings also available.

5 FRONT ENDS—Choose from shovel, crane, clamshell, dragline and hoe—all interchangeable. Your "50" can help you win many bids.

ANTI-FRICTION BEARINGS — Tapered anti-friction turntable rollers—anti-friction bearing mounted Swing Drums—anti-friction bearing mounted Hoist Drums.

Be "CHOOSY" when you buy a Shovel-Crane

Times have changed! Today, you can get most *any* brand you want—when you want it. Not long ago, perhaps you bought just any make of shovel-crane "because it was available". Now you can return to *selective* buying to get the most for your money.

In the 1-yard Lorain-50 "Series" shovel-crane class, as well as in the rest of the wide Lorain line, there are solid values and exclusive design features that pay off in profits. They are not just "gimmicks" to confuse the buyer—but are an honest-to-goodness combination of values that you won't find in any other 1-yard class machine.

Be *"choosy"*. Make sure your shovel-crane investment will pay you greatest profits. Choose from the complete Lorain line —from ½ to 2-yard classes—at your Thew-Lorain Distributor.

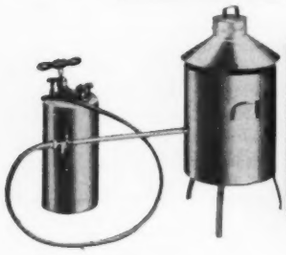
THE THEW SHOVEL CO., LORAIN, OHIO

THEW LORAIN. 1-YARD 50 CLASS

Sales Manager for Le Roi

The Le Roi Co., Milwaukee, Wis., has named Paul D. Sullivan manager of contractor sales for the construction and mining division. Mr. Sullivan will be responsible for Le Roi sales to large contractors throughout the country and will assist dealers with some of the selling problems involved in large-scale contracts.

WILL WINTER STOP YOU COLD?

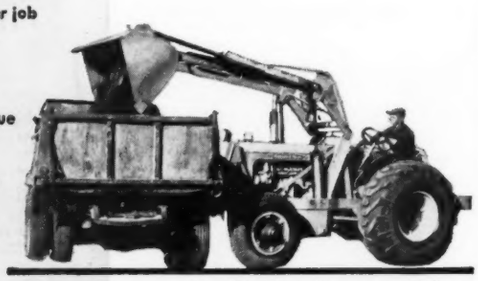


AEROIL oil-burning Salamanders keep winter construction crews ON THE JOB even through the worst freeze-ups. Clean and economical, Aeroil Salamanders eliminate all the hazards of coke burners. You can solve your winter heating problem in a snap with Salamanders, Coil Type Water Heaters, and Concrete Heaters by Aeroil . . . *Write for free bulletin 210 RS.*

AEROIL PRODUCTS COMPANY, 75 WESLEY ST., SOUTH HACKENSACK, N. J.

MM WHEELERS

- Equipped for your job
- easy to handle
- high speed
- large capacity
- high engine torque at low rpm
- durable single unit construction
- low in cost
- nearby parts and service



Up and out, with power to spare! Heavy-duty MM Wheelers offer the important advantages of proved conventional design.

Rugged MM WHEELERS

Built and equipped for your heavy jobs!

CONVENTIONAL DESIGN FOR FRONT OR REAR END ATTACHMENTS

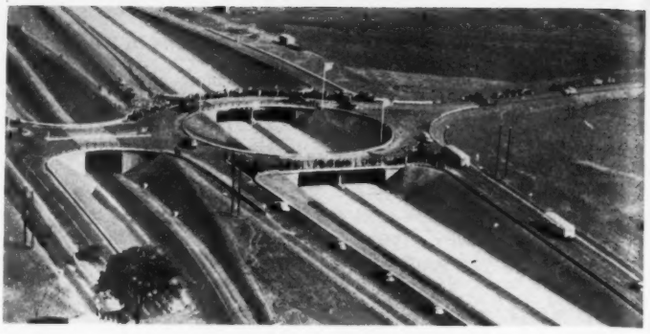
You get *more work* out of MM Wheelers with this conventional design that handles a *bigger* variety of attaching equipment. Front and rear mounted equipment makes *both* ends of your Wheeler pay. Practical drawbar applications further reduce machinery investments. MM design combines economy of first cost; fast, easy operation; ability to handle *more* tool types, and real operating safety.

Let your MM distributor demonstrate. See for yourself why MM owners call their Wheeler and equipment combination the "one man contractors."

MORE WORK from more equipment! MM Wheeler owners get all the advantages of design that make *both* ends pay — like this 3 yd. scraper.

Provisions for rear mounting give you real back-hoe performance. Again, Wheeler design pays off with more work from standard design.

MINNEAPOLIS-MOLINE
MINNEAPOLIS 1, MINNESOTA



Traffic entering, leaving, and crossing Sweden's Autostradan is able to move smoothly by means of this rotary overpass. The total length of approach roads equaled the length of the new four-lane highway.

Modern Highway Replaces Sweden's First Paved Road

AN ULTRAMODERN four-lane highway has replaced Sweden's first paved road, which was built 50 years ago. Stretching 11 miles between the cities of Lund and Malmo in southern Sweden, the new Autostradan cost $400,000 per mile.

The new route consists of two 23-foot concrete strips separated by a 10-foot grass-covered median. Eight-foot banks on each side are compacted to accommodate traffic making emergency stops.

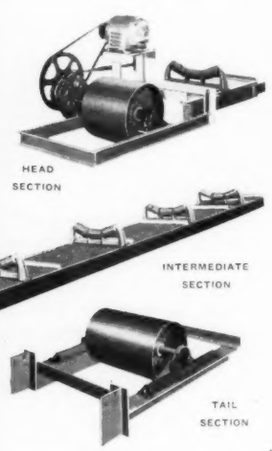
No blasting was required in the road's construction. A layer of gravel nearly 8 inches thick was laid on a clay bed. In all, 350,000 bags of cement were used for 270,000 square yards of concrete surface.

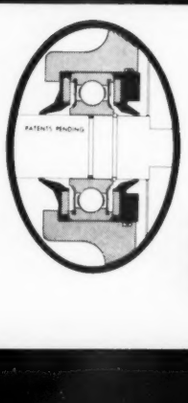
An average of 6,500 to 7,500 cubic yards of dirt was moved each day for a total of 650,000 cubic yards. Of this, 162,000 cubic yards was topsoil that had to be carried off.

Twenty-seven bridges and viaducts span the route. The side road approaches total 11 miles in length. Approximately 25 miles of sewer and drain pipe went into the project. The side roads and ramps have a total asphalt surface of 120,000 square yards. In the Autostradan's approach, 65,000 cubic yards of concrete had to be poured.

There were 450 men working on the job, 50 of them engineers or foremen. Gravel hauling was handled by 150 trucks. Other equipment used in the construction included five Caterpillar D8 tractors with three Caterpillar scrapers and two LeTourneau scrapers, ten Caterpillar D7 tractors with dozers, five Cat D4's, three Cat No. 12 motor graders, two Northwest shovels, five Euclid trucks, three Tournapulls, and two Tournadozers. THE END

STOP LUBRICATION COSTS for BELT CONVEYORS

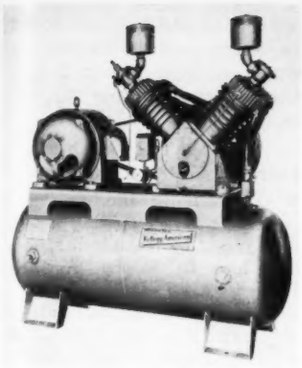




Transall Type C is pre-engineered, pre-fabricated. Use head and tail section and variable number intermediate sections to quickly assemble conveyor to fit any size installation. Easily shortened, lengthened or moved. Permanently lubricated Tran-Seal Idler bearing is factory-sealed as illustrated at left, keeps lubricant in and dirt out, never needs re-lubrication. Reduces maintenance costs. For details, write TRANSALL, INC., 119 N. 11th St., Birmingham, Alabama.

(119-M)

TRANSALL SECTIONAL BELT CONVEYOR SYSTEMS



The tank-mounted Kellogg-American Model BD461A air compressor features dual controls for intermittent or constant use.

Air-Compressor Line

■ The addition of 15 and 20-hp air compressors to their present line is announced by the Kellogg Division of the American Brake Shoe Co., 97 Humboldt St., Rochester 9, N. Y. These models extend the range of Kellogg-American air compressors from ⅓ hp through 20 hp with displacements up to 105.9 cfm.

Of V-type construction, the 4-cylinder two-stage air compressors are available in 22 different models.

For further information write to the company, or use the Request Card at page 18. Circle No. 353.

Off-the-Road Tires

■ An illustrated booklet showing off-the-road tires on a variety of rugged hauling jobs is available from The B. F. Goodrich Co., Akron 18, Ohio.

The company makes off-the-road tires for every type of specialized construction work. Shown, for example, are new 65-inch all-nylon special earth-moving tires at work carrying 24 tons of sand fill. These tires are designed to float over loose soils without sinking in.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 431.

Line of Hauling Scrapers

■ Literature on carrying scrapers of 3 to 12-yard heaped capacity is available from the Slusser-McLean Scraper Co., Sidney, Ohio. The drawn scrapers are suitable for use with tractors in the 20 to 90-hp range.

All Mammoth hauling scrapers are double-cable controlled. One cable controls the depth of cut and spread, and the other controls the front apron and dumping. Operation is through a 2-drum hoist connected to the power takeoff of the tractor.

A center-spread photograph in the catalog illustrates other features of the scrapers. These include large sheaves located well above the dirt line, a high arched front frame member that permits wheels to cut under sharply for short turns, and an all-welded drawbar of box-type construction. Construction features also include an all-welded box-type frame and a full-length one-piece rear axle. The scrapers were equipped with a heavy, reversible, manganese steel blade.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 382.

For Convention Calendar—page 84.

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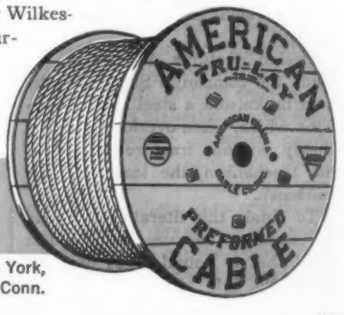

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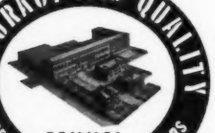

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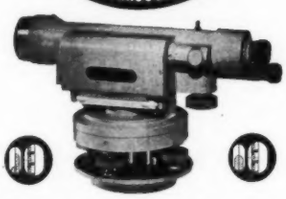

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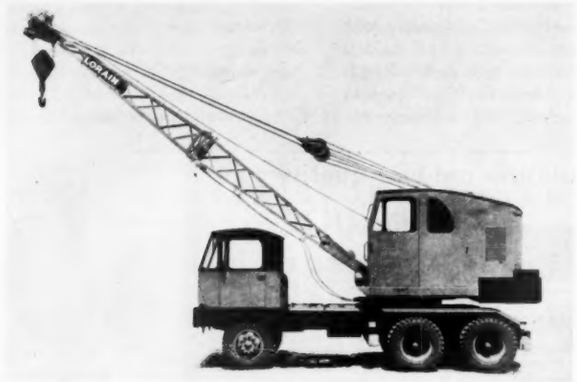

The new Lorain Model MC-254W Moto-Crane.

New Excavator Cranes Are Truck-Mounted

■ Two new additions to its Moto-Crane line are announced by The Thew Shovel Co., 28th St. and Fulton Road, Lorain, Ohio. They are Model MC-254W in the TL Series, with a lifting capacity of 17½ tons, and Model MC-424 with a lifting capacity is 22½ tons.

Model MC-254W is a 3-axle unit available as a ¾-yard shovel, crane, dragline, clamshell, hoe, or 1¼-cubic-yard scoop shovel. Over-all width is 106 inches, giving additional lifting capacity on rubber without outriggers, while maximum boom length with tip extension is 95 feet. The machine is equipped with eight forward and two reverse speeds plus air brakes. Its top speed is 37 mph. The new Lorain may be obtained with diesel or gasoline power for turntable and carrier, with front driving-axle, third drum, and other accessories.

The 22½-ton Model MC-424 is a 2-engine machine with a gasoline-powered turntable. The superstructure is mounted on a 3-axle carrier, with drive on the two rear axles powered by a separate gasoline engine. The carrier has ten forward speeds up to 27 mph and two reverse speeds. It has an over-all width of 96 inches and is equipped with air brakes. The maximum boom length with tip extension is 125 feet. The unit may be equipped with diesel power for turntable, third drum, power-load-lowering, front-wheel brakes, and many other accessories. The MC-424 is convertible to shovel. crane, clamshell, dragline, or hoe boom.

For further information write to the company, or use the Request Card at page 18. Circle No. 362.

Line of Hand Hoists

■ Hand hoists with capacities from ½ to 2 tons are described in a bulletin issued by the materials-handling division of the Yale & Towne Mfg. Co., Roosevelt Blvd. at Haldemann, Philadelphia 15, Pa. The hoists depicted in the booklet are light in weight and up to 95 per cent efficient.

Design features illustrated include the company's Synchro-matic load brake and a steel safety load-hook which, when overloaded, opens slowly without fracture to protect the mechanism, the load, and the workmen.

To obtain this literature write to the company, or use the Request Card that is bound in at page 18. Circle No. 404.

Oiler for Air Tools

■ Excessive wear and break-down in air tools is said to be prevented by a new oiling device that attaches directly to any pneumatic tool. The Wright Air-Line Oiler provides a regulated oil flow to the tool in all positions. A wick filter prevents clogging and atomizes the oil for better lubrication. In addition, the manufacturer reports, the oil-metering valve cannot vibrate shut.

The oiler weighs less than 2½ pounds in the one-half pint size. It also comes in a one-pint size.

A blowout-proof window in the filler cap shows the oil level at all times. The cap itself screws on or off by hand to adjust the oil-metering valve or to fill the reservoir. This adjustment is said to permit the use of all types of lubricating oils from light machine oil to heavy rock-drill oil in both summer and winter.

For further information write to the Wright Power Saw & Tool Corp., 292 Longbrook Ave., Stratford, Conn., or use the Request Card at page 18. Circle No. 358.

Line of Melting Pots

■ An illustrated brochure on its portable wheeled melting pots has been issued by the Aeroil Products Co., Inc., 69 Wesley St., South Hackensack, N. J. The equipment shown is used for melting and heating sewer pipe and electrical pipe compounds such as Sewer-Seal, G-K, Hydro-tite, Mineral Lead, enamels, and tar. Units come equipped with either kerosene burner outfits or bottled-gas burners.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 352.

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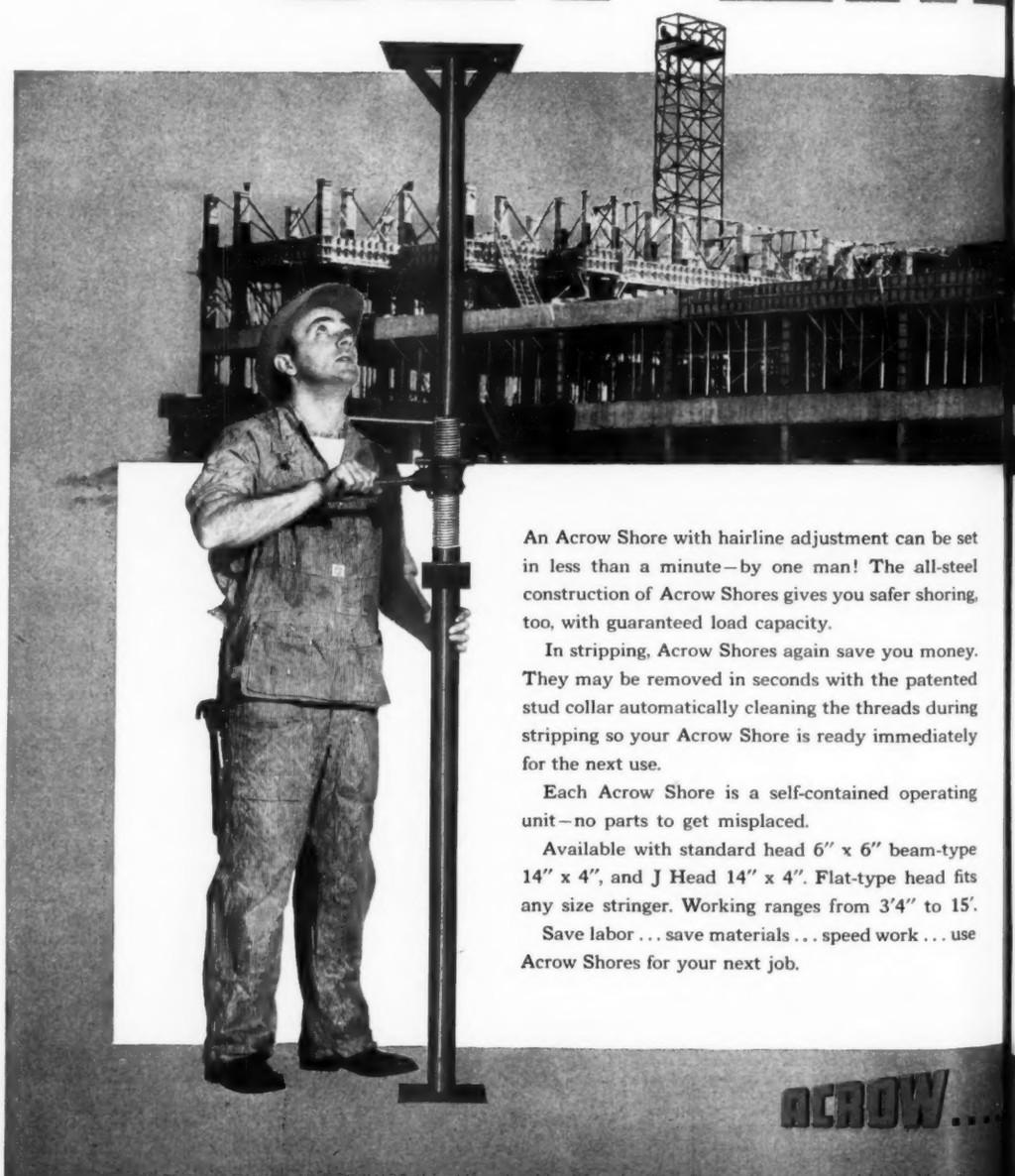

An Acrow Shore with hairline adjustment can be set in less than a minute—by one man! The all-steel construction of Acrow Shores gives you safer shoring, too, with guaranteed load capacity.

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Available with standard head 6" x 6" beam-type 14" x 4", and J Head 14" x 4". Flat-type head fits any size stringer. Working ranges from 3'4" to 15'.

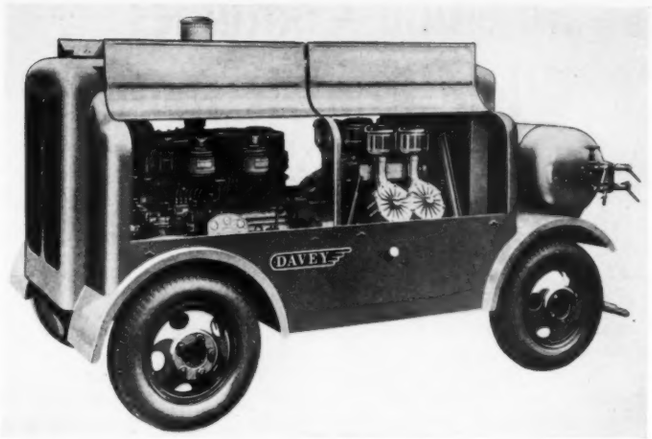
Save labor . . . save materials . . . speed work . . . use Acrow Shores for your next job.

ACROW . . .

Portable Compressor Has 600-CFM Capacity

■ A 600-cfm diesel-powered portable compressor is announced by the Davey Compressor Co., N. Water St., Kent, Ohio. The new unit, the Davey Super Chief 600, is available on both skid and 4-wheel trailer mountings. The company's line now includes portable units of from 60 to 600 cfm.

The new compressor has four low-pressure cylinders with 8-inch bore and 4-inch stroke, and two high-pressure cylinders with 6⅝-inch bore and 4-inch stroke. Standard features include automatic compressor-engine controls; individually finned separately-replaceable cylinders; full force-feed lubrication; cast aluminum crankcases; multi-port valves; automotive-type steering; full spring suspension; and double built-in tool boxes.



The trailer model is 150 inches long, 75 inches wide, and 95 inches high. Its net weight is 9,300 pounds. Dimensions of the skid unit are 150 x 63 x 69 inches, and its weight is 8,700 pounds.

For further information write to the company, or use the Request Card at page 18. Circle No. 365.

New Exhaust System Will Absorb Loud Noises

An exhaust system that absorbs loud noises, developed by the GMC Truck and Coach Division, went into production on GMC truck models just a few weeks ago. According to the company, neither GMC nor the muffler manufacturers who assisted in developing the system are keeping details of its manufacture secret; other manufacturers are being encouraged to adopt it.

The new system is called "Silent Power"—indicating that while objectionable exhaust noises have been eliminated, engine power has not been decreased. Although the system costs more to manufacture, it will be made a standard feature on GMC equipment at no extra cost to the user. Because of the various volumes of noise to be silenced on each of GMC's gasoline and diesel engines, a different system has been developed for each.

Work on the exhaust began two years ago in response to demands made by truck operators. The final product was a reverse-flow type muffler, larger than those presently in use, made more rigid by the use of heavier gages of metal and incorporating new exhaust manifolding and larger exhaust pipes.

New Flight Augers For Earth Boring

■ A new heavy-duty flight-type auger has been added to the line made by the Petersen Engg. Co., 460 Kifer Road, Santa Clara, Calif. Designed for large jobs and for use on gravel or loose material, the auger is said to complete holes in fewer trips in and out because of added carrying capacity with additional flights. Diameters available run from 16 to 36 inches.

The Pengo line's double-cutting feature is retained with flights as level as possible. The standard valve used to close the open side insures maximum load. The new flight-augers are made in 26-inch lengths for use on all makes of boring machines and also in 34-inch lengths for machines mounted high enough to accommodate long flights.

For further information write to the company, or use the Request Card at page 18. Circle No. 391.

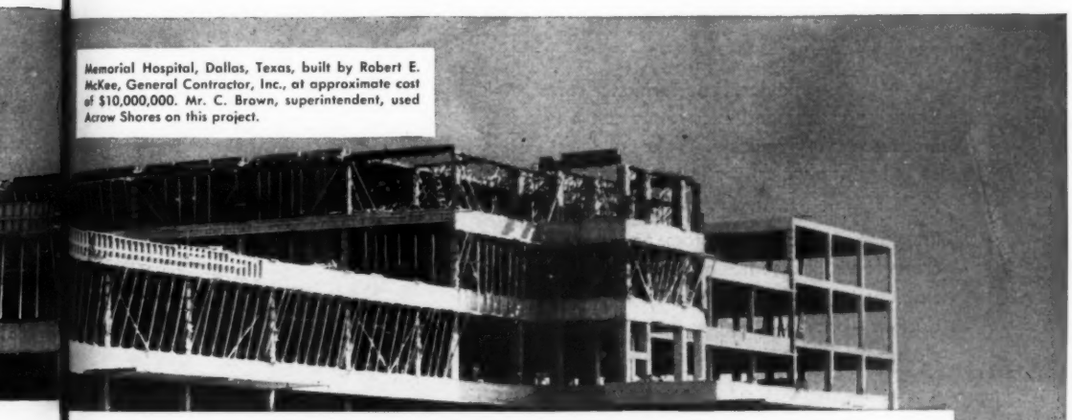
New Excavating Movie

A 16mm sound color movie featuring the Hystaway excavator-crane attachment for Caterpillar-built tractors is now available from the Hyster Co., 2902 N. E. Clackamas St., Portland 8, Oreg. Produced by Hyster, "Design for Excavating" illustrates the Hystaway in operation on D6, D7, and D8 tractors.

Featured is the quick change from shovel to backhoe, clamshell, crane, pile driver, and bulldozer. Many earth-moving, construction, and materials-handling ideas are shown.

Information concerning the booking of the film can be obtained at any Caterpillar-Hyster dealer or by writing to the Hyster Co.

UP FAST



Memorial Hospital, Dallas, Texas, built by Robert E. McKee, General Contractor, Inc., at approximate cost of $10,000,000. Mr. C. Brown, superintendent, used Acrow Shores on this project.

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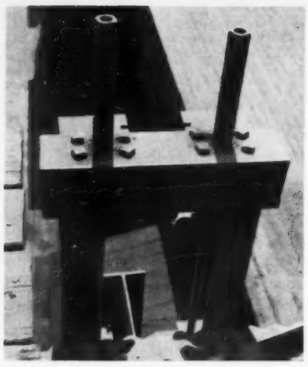
Smelting Continues While Roof Is Raised

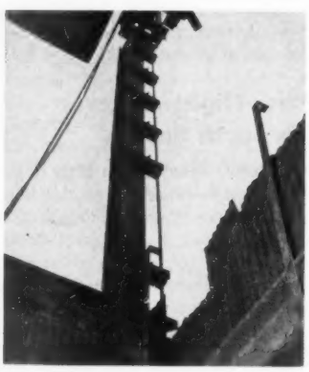
Contractor's crews work right above smelting operations; plant expansion completed without interfering with work



One of the 38 specially-constructed steel yokes which held the slip-form jacks.

A 75-FOOT-HIGH roof, weighing more than 400 tons, was elevated an additional 15 feet without the use of any interior or exterior shoring or supports and without interruption of the plant's manufacturing activities. The task was accomplished by means of 80 Nelson slip-form screw jacks held by 38 specially-designed steel yokes.

The job, part of a multimillion dollar plant-improvement program, was completed by 30 ironworkers in six 8-hour days under the direction of the Jarvis-Courtney Corp., Clarksburg, W. Va., general contractors. The entire roof, with workmen and equipment, was raised as



Lifting rods rested on seat angles welded to the old columns.

a unit, an inch at a time. The job was rigged in the same manner as a concrete silo.

The plant, which produces zinc bars, is operated by the Meadowbrook Corp., a subsidiary of the Matthiessen & Hegeler Zinc Co., La Salle, Ill. Located 3 miles north of Clarksburg, it was originally built for the Grasselli Chemical Co., a du Pont subsidiary, about 25 years ago. Meadowbrook acquired the enterprise in 1949. The plant has been in continuous operation 365 days a year, 24 hours a day, since it was originally opened. Should it ever become necessary to shut down, even for a short time, it would have to cease operations completely.

The roof-raising would have been a relatively simple job had it permitted the use of conventional methods. But the construction process could not interfere with the plant's cranes, which were operated 4 feet from the roof trusses. The crane equipment cleared the bottom of the trusses by only 4 inches.

To Replace Furnaces

Last year, Meadowbrook decided to enlarge its smelting operations by 50 per cent. This meant it would have to replace its 18 vertical retort furnaces with taller units of a larger capacity. In addition, three coking furnaces had to be replaced with new, bigger installations. These proposed changes made the additional 15 feet of space under the roof necessary.

In normal plant operation, the cranes traveled the full length of the 280-foot-long building every 14 minutes. If a shutdown was to be averted, the roof had to be raised without interfering with the cranes' operations. Then, the furnaces could be replaced one by one, and production could proceed with a minimum of disorder.

In spite of the skepticism of outside engineers and the reluctance of insurance companies to undertake the risk of such a project, Jarvis-

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Big payload performance of Koehring cranes and excavators can be measured very quickly. Take a look at lifting capacities, for instance.
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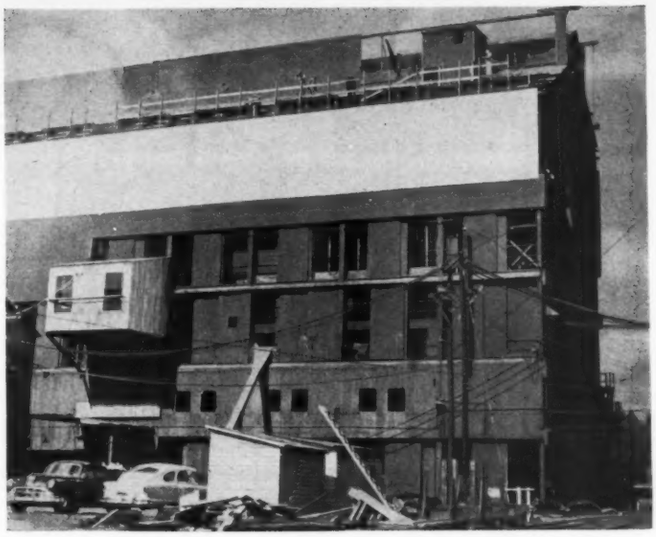
A general view of the roof-raising project. Fifteen feet of new steel siding went on first; then the roof was raised by 80 jacks lifting from the top.



Courtney convinced Meadowbrook that jacking up the roof from the top as a complete unit was feasible.

Jarvis-Courtney started the job by welding 15-foot additions to the steel columns, adding girts and channels to hold the new steel siding. The siding was added on both sides of the building. Working platforms were built along each side of the roof. Seat angles were welded to the old columns with sufficient strength to carry the entire load.

Special Steel Yokes

The next step was the erection of the special steel yokes to hold the jacks. Thirty-eight of these, each designed to hold a pair of jacks, were erected at the end of each truss. Four jacks were used at the gables, making a total of 80. The rods from the jacks rested on the seat angles; the jaws of the jacks gripped the rods. As the jacks were turned, an inch at a time, the yokes rose and carried the roof upwards.

One man was assigned to four jacks. When the general foreman blew his whistle, each would turn his group of jacks. Sometimes a turn was accomplished in ten minutes; other times there would be a lapse of two hours between whistle signals—depending on the problems encountered. As the jack custodians finished turning their jacks, a crew of steelworkers below would release the bolts holding the rods and reset them for another turn.

Special safety precautions were taken. Guardrails were erected along the runways and a shed was built on top of the roof so that men could rest and have a place to eat free from the smoke and zinc dust. The smoke presented a major health problem. An average of five or six men would be forced to quit daily because of illness from the fumes.

An intercommunication system connected the ground with the roof on both sides of the building. An ironworker patrolled the length of the building along the runways on each side looking for stripped bolts or bent rods. Several were found and replaced.

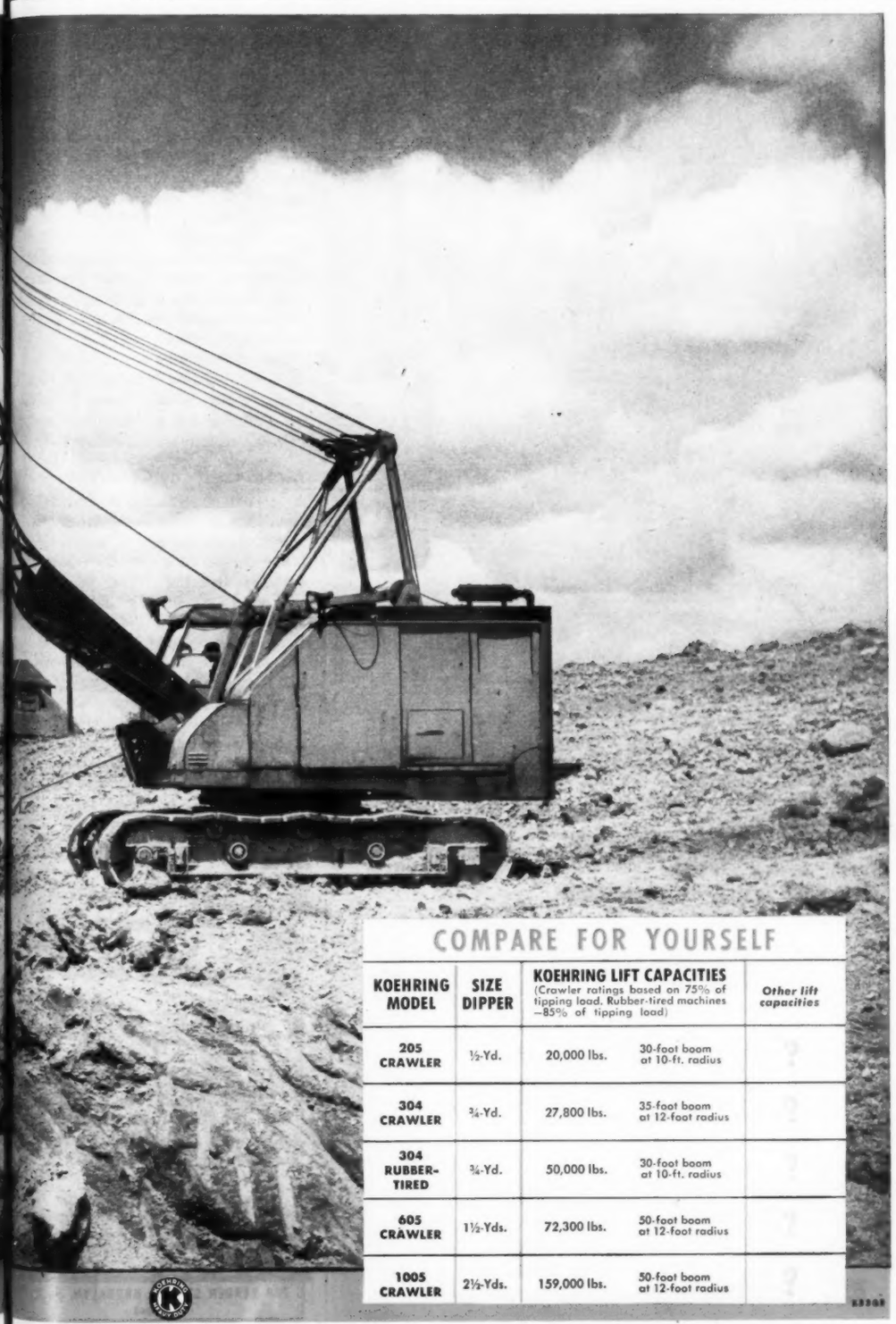
Weather Reports

The weather was an important consideration. Long hours had been spent before the start of the project going over meteorology reports in order to pick the best-suited week for the operation. A high wind easily could have wrecked the project. Even rain would have presented a major problem. Each morning during the job, the weather forecast for the day was carefully scrutinized. It was estimated that five hours would have been required to secure the roof against a heavy windstorm.

An interesting sidelight developed during the roof-raising. After the job started, an analysis showed the dust adhering to the underside of the roof contained a high percentage of valuable zinc oxide. When the job was in its planning stage, engineers had estimated there might be 25 to 30 tons of this dust, accumulating since the plant opened.

Jarvis-Courtney was given the added task of removing the dust. To the surprise of everyone connected with the job, a total of 200 tons of zinc oxide was reclaimed. With zinc selling at 17 cents a pound, the reclamation was worth while.

With the roof-raising now completed, Meadowbrook and Jarvis-Courtney are turning their attention to the installation of the new furnaces. The cokers are scheduled for a December, 1954, deadline and the replacement of the retorts will follow. THE END



New Line of Trucks Features V-8 Engines

■ New V-8 truck engines are among the seven power plants in a current line of Dodge Job-Rated trucks. The new V-8 engines, power steering, more compact tractors, an improved steering linkage, wider front treads, new frames, increased driver comfort and visibility, lower loading height, and better road-stability are among features found in the recent line.

The C-1 trucks are powered by seven engines ranging from 100 to 172 gross hp. The V-8 power plants are offered in three ratings in this series. These include 133 hp in 1½, 2, and 2½-ton models, 153 hp in 2¾-ton models, and 172 hp in 3 and 3½-ton models. Six-cylinder engines supply power for models ranging from the low-tonnage 100-hp B and C models to the high-tonnage 171-hp Y and YX models which develop 343 pound-feet of torque at 1,500 rpm. Gross vehicle weights range from 4,250 to 40,000 pounds, and gross combination weights reach up to 60,000 pounds.

The 2½-ton model from the new C-1 Series Dodge truck line shown in construction work.

According to the manufacturer, the new engines were designed to operate at sustained high speeds at lower cost on regular gasoline and to maintain their original power and efficiency for a longer period without major service work. The hemispherical combustion chamber is said to obtain more power from regular fuel with the help of the lateral overhead-valve arrangement and other features which aid fuel combustion and cooling.

The long, low appearance of the C-1 Series is the result of new functional design, redesigned springs, and chassis improvements which have reduced actual truck height as much as 3 inches on some models. This, in turn, has reduced loading height to save labor costs and has brought a new low center of gravity with greater road-stability.

Compact tractors that make it possible to use longer trailers while still meeting legal limits on combined tractor-trailer lengths are also announced. For example, new conventional tractors are 102 inches long from front bumper to back of cab to permit the use of standard 35-foot trailers to meet 45-foot over-all legal length limits in every state. Cab-over-engine tractors have been compacted to 81 inches.

For further information write to Dodge Job-Rated Trucks, Chrysler Corp., 21500 Mound Road, Detroit 31, Mich., or use the Request Card at page 18. Circle No. 442.

Metal Lath for Concrete

■ Metal-lath centering to provide a rigid form and reinforcing for short-span concrete slabs over steel joists is the subject of a recently released technical bulletin. Types of metal lath used in centering, details and sample specifications for installation, and safe loads for ⅜ and ¾-inch rib lath and sheet lath are included in the booklet.

To obtain this literature write to the Metal Lath Manufacturers Association, Engineers Building, Cleveland 14, Ohio, or use the Request Card at page 18. Circle No. 372.

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with LIMA type 1201

3 or 3½ yd. capacity

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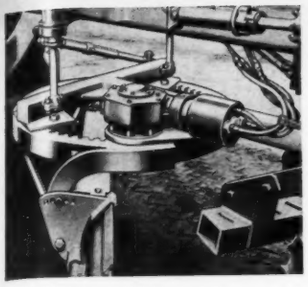

Motor Grader Improved

■ The Model 503 tandem-drive motor grader made by the Galion Iron Works & Mfg. Co., Galion, Ohio, is now available with a hydraulic-powered circle. Connection from the hydraulic motor to the circle is by means of an enclosed worm reduction gear and a spur pinion gear which meshes with the teeth on the circle. It is claimed that the location of the gear teeth on the inside of the circle permits a more compact and rigid assembly and also provides gear teeth with greater protection against damage.

For further information write to the company, or use the Request Card at page 18. Circle No. 373.

Traffic-Accident Booklet

"Traffic-Accident Studies", a bulletin containing four papers dealing with various phases of accidents on the highways, has been published by the Highway Research Board under the sponsorship of the Department of Traffic and Operations.

One study discusses the trends during a half century of automobile accidents in terms of various rate indices, accident type, and circumstances. Another deals with the relationship between the number of accidents and traffic volume at divided-highway intersections. A third report discusses the effect of road design features and use-characteristics on accident rates on main rural highways. The last is a progress report of a case history study to determine the effect on accidents when signals are installed.

Bulletin 74 may be obtained for 90 cents by writing to HRB, National Academy of Sciences, National Research Council, 2101 Constitution Ave., Washington 25, D. C.

A Repair Process For Earth-Mover Tires

■ A repair service for large earth-moving-equipment tires is described in a bulletin from the Forbush Co., 110 Grand Ave., Pueblo, Colo. The repair process involves both bolting and vulcanizing. The company's Vulca-Bolted method of tire repairing makes use of flat-headed bolts covered with live rubber. The bolts create a tight bond for the repaired section and prevent it from slipping. The company states that tire breaks do not reopen and the inner tube is not harmed because of the type of bolt used.

The service offers section repair and reinforcement repair, and the literature includes a list of prices for each type of work. Prices vary according to size of tire and type of repair.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 428.

Gravel Plants Described Have Bottom-Deck Feed

■ A series of bulletins describing and listing specifications on the company's new line of bottom-deck feed plants for gravel aggregate production is available from Pioneer Engineering Works, Inc., 1515 Central Ave., S. E., Minneapolis 13, Minn. The new line consists of seven sizes of plants that offer a range of 40 to 96 square feet of effective screening area.

Plant set-ups are shown and color diagrams trace the flow of material through the plants. The bulletins point out how bottom-deck feed can be utilized to obtain maximum efficiency from all the units in the plant. This is done through a balance of the loads between crushers requiring no change of screens and through the use of two decks for specification sizing which doubles the effective screening area.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 450.

How to Choose Explosives

■ A new booklet that serves as an aid in the selection of explosives for construction, pipelining, and other types of work is available from the Atlas Powder Co., 904 Market St., Wilmington 99, Del. The booklet summarizes in text and pictures the methods and explosive materials commonly used for most effective and economical results in nine major industries.

The catalog section describes and tabulates the properties of the various types of explosives, blasting caps, fuses, blasting equipment, and accessories. Included is a section on the Rockmaster millisecond delay system of blasting. The index includes more than 150 items.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 355.

Whiteman Power Buggies roll right under truck-mixer chute to receive their loads.

Concrete is poured directly into Power Buggies which handle capacity loads every trip.

Power Buggies speed over portable timber ramps at 16 mph, never get tired.

Concrete is poured quickly, accurately with dumping mechanism under positive control at all times.

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YARD-A-MINUTE PACE...

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According to the contractors,* "complete mechanization of concrete pouring and finishing greatly expedited the job and held costs to a minimum." Whiteman equipment can save time and money for you, too. Send coupon now for details.

*Merritt-Chapman & Scott Corp. and Corbetta Construction Co., joint-venture contractors. Whiteman equipment furnished by Contractors Supply Co.

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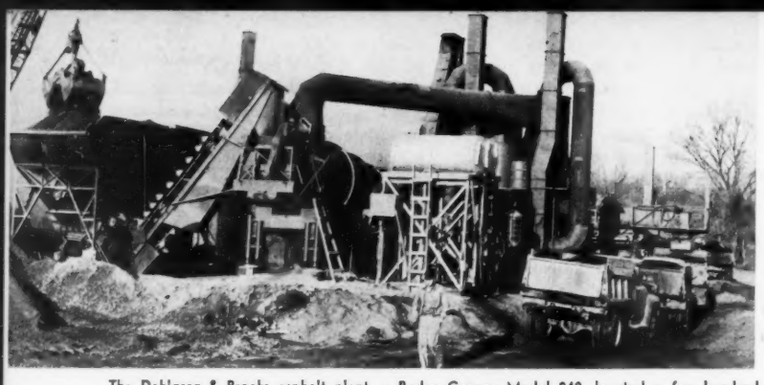

The Dahlgren & Brooks asphalt plant, a Barber-Greene Model 848, located a few hundred yards off the job. All the hot-mix was batched from this central setup.

A lift on the granular base course is compacted by a Grace roller towed by a Ford tractor. Trucks also aided in compaction and in revealing flaws in the base course.

Four-Lane Road Helps Badly Congested Are

Two contracts, totalling 11.5 miles, included earthwork finishing, base course, and asphaltic concrete paving

THE 88-MILE Turner Turnpike between Tulsa and Oklahoma City, Okla., is relieving one of the most congested and dangerous sections of highway to be found in the United States.

The firm of Dahlgren & Brooks, Okalhoma City, Okla., had the contracts for a vital 11½-mile section of asphaltic concrete paving on the eastern portion of the new speedway, between Bristow and Sapulpa, Okla. The job was divided into two contracts because of an unusual stipulation made by the Oklahoma State Legislature. The legislature, when it authorized the construction of the turnpike, put a $1,000,000 limit on all individual contracts. Therefore, DeLeuw, Cather & Co., Sapulpa, Okla., consulting engineers operating under the Oklahoma Turnpike Authority, awarded a $608,268 contract for 5.65 miles of pavement and a $650,000 contract for the adjacent 5.92 miles, both to Dahlgren & Brooks.

The two contracts called for earthwork finishing, the preparation and laying of 7 inches of crushed-stone subbase, and the preparation and laying of asphaltic concrete in two courses—a 3-inch coarse base lift and a 2-inch surfacing course of finer material. Shoulder material was to be stabilized with asphalt, and a bituminous-chip cover coat was to be prepared and spread over the shoulders. Miscellaneous items included the construction of a median

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Construction Equipment Division
Plainfield, New Jersey

Ray Day Photos

General view of the paving operation. Two Barber-Greene asphalt finishers, fed by 8-ton batch trucks, work practically side by side.

strip and a general cleanup of the area.

Divided Four-Lane Road

Specifications were typical of those set forth for most of the turnpike. Plans called for a 24-foot asphaltic concrete roadway and a 12-foot shoulder on each side of a 15-foot median. The crushed-rock subbase was required only under the asphaltic concrete.

The production, delivery, and field preparation of the subbase was subcontracted to H. D. Youngman Construction Co., Baxter Springs, Kans. Youngman had previously laid 25 miles of this material under other contracts. He used Pioneer and Cedarapids rock-crushing equipment, setting up his machines in pits located within five miles of the project. The pits contained either limestone or silica, both durable but abrasive. Rattler loss tests on both checked out at 32 to 35 per cent. It was nearly impossible to break the rocks down by any method except crushing with modern machines. Youngman worked through the winter of 1951-52, stockpiling tons of this material ahead of actual need.

Base Preparation

For the base preparation, Youngman laid out construction sections of about 2,000 feet average length. In exceptional cases, where good runs

(Continued on next page)

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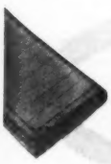

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New Four-Lane Road Helps Congested Area

(Continued from preceding page)

were possible, sections as long as 5,000 feet were tackled. Previous grading contracts had set down 16½ inches of highly compacted select material over the general subgrade. It had been placed at the time of grading so it would be available later for the median and shoulders. Youngman employed six Caterpillar No. 12 motor graders to cut away 4½ inches of the material.

That portion of the dirt needed for the median was bladed over to the proper location. The rest was similarly bladed to the sides for the shoulders. The earth was stockpiled in such a way that positive drainage would be assured in case of rain. The remaining 12 inches of select material was heavily rolled by pneumatic compactors to an exact tolerance.

A Northwest 1½-yard shovel worked at the stockpiles of crushed rock, loading into a fleet of 40 rented dump trucks of 5-yard capacities. The trucks were able to haul an average of eight tons per load so that approximately 65 per cent of the 7-inch lift was placed on the first pass. After the rock was dumped, it was knocked down by motor graders in the conventional way.

To add the necessary fines and increase the cohesive quality of the rock base, about 20 per cent river sand and 5 per cent fine blow sand by weight was added to the mix. River sand had to be hauled 16 miles from a pit at Sand Springs, but the blow sand could be had practically anywhere along the right of way. These finer materials were added to the top of the ribbon of crushed rock.

Base Is Road-Mixed

The entire volume of rock-base material was road-mixed by motor graders. Water trucks, supplied by 3-inch Jaeger pumps at two creek locations, added moisture to the mix as the process took place. When a fine blend had been made, the windrow was laid. Working from the edge of the windrow, the motor graders cut out slices of the material, rolling them over to where they could be laid in lifts not much thicker than the 2-inch maximum rock dimension. Bros and Tampo pneumatic rollers, towed by International and Massey-Harris tractors, worked the material down to the 95 per cent standard Proctor density required by the specifications. As many as three units worked together on a single spread.

After the main lift had been completed, the top course was laid in the same way. Rolling of the top course was done by pneumatic and steel-wheel machines. The final step was the application of 0.25 gallon of MC-1 asphalt to serve as a prime coat and also as protection against rain. This was done by a Littleford pressure distributor. The oil was sprayed at a temperature of not more than 110 degrees F, and the primed sections were opened to construction traffic after a short period of curing.

Construction traffic used the prime base as much as possible to reveal any flaws which might have been missed when the rock base was set down. Traffic was also permitted after the first course of asphaltic concrete was laid. Occasionally, the passage of a heavy truck did reveal a spot where full compaction had not been achieved. In such cases the unsatisfactory material was ripped up by motor graders, aerated for drying if necessary, and replaced.

Asphalt Plant Setup

Asphaltic concrete was batched from a central setup; one location served the entire job. The site was off center, however, and some hauls were as much as 11 miles long. Dahlgren & Brooks used a Barber-Greene Model 848 plant, situated a few hundred yards off the turnpike near Kellyville. A large percentage of the filler for the mix was produced by Youngman in a pit about two miles from the plant. Some smaller pits closer to the plant were also used.

Trucks carried the aggregate from the pits to the plant. Base-course material, 1½-inch-minus, was dumped in one pile, and ¾-inch-minus rock for surfacing was dropped in another. Materials added to meet grading requirements included washed Arkansas River sand from Kellyville and chat from the lead mines near Miami, Okla. Both materials were transported by rail. They were unloaded by a P&H 1½-yard clamshell and trucked to the asphalt plant. There, they were stacked in piles within the radius of the charging crane, a ¾-yard P&H equipped with a Blaw-Knox clamshell bucket.

Asphaltic cement was an 85 to 100 penetration material from the Kerr-McGee Oil Industries, Inc., refinery at Wynnewood, Okla. Loaded in trucks at a temperature of 325 to 335 degrees F, the asphalt was motored to the hot-plant at Kellyville by Grissom Bros. of Wynnewood. At the plant site, the asphalt was dumped into a pair of 8,000-gallon horizontal steel storage tanks

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Large photo shows position of bucket when at extreme height above ground. Two small photos illustrate how, in excavation or loading, bucket follows slope of material—getting a full bucket with every stroke. Dempster-Diggster digs-in 15 inches below grade and digs out a 15 to 18 foot bank.

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which were heated by steam coils from a central boiler by means of a Viking asphalt pump. The boiler used No. 6 fuel which was stored in another 8,000-gallon horizontal tank.

The asphalt plant was a stock model which had not been altered to any great extent. The equipment used in conjunction with the plant, however, included an 87-hp Broderick stationary boiler. Fired by No. 6 fuel, the boiler used its own steam for fuel atomization. It had several functions, including the heating of steam coils in the asphalt tanks, the heating of No. 6 fuel oil to increase its pumping efficiency, pugmill heating, and burner atomization at the plant dryer.

Plant Power

Main engines driving the plant components included a GM diesel on the pugmill and an International UD-9 on the dust-collector blower. An International UD-18 powered the 7 x 30-foot Model 837 dryer on the plant.

Materials moved through the asphalt plant in a conventional pattern. The cold aggregates were raised by a cold elevator and dumped to the plant dryer. After they emerged from the dryer, they were raised by a hot elevator to the three-deck sizing screens. There, they were sized, and reject material was dropped off. Then, the aggregates passed to storage bins next to the weigh hoppers. Emerging from the weigh hoppers, they passed into the pugmill where they were mixed with asphalt.

Asphalt, on the other hand, moved in a continuous loop from storage, past a hot pot where it was drawn off. The asphalt content of the base-course paving was 5.3 per cent, while that of the surface course was 5.7 per cent. Temperatures of both rock and asphalt were maintained between 285 and 300 degree F.

The asphalt mix formula was based on the following proportions:

Type A Base Material	
Crusher-run rock aggregate	60 per cent
Miami chat	12 per cent
River sand	15 per cent
Blow sand	13 per cent

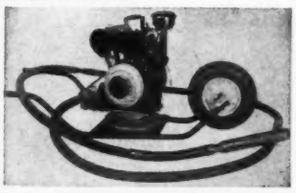
Type B Surfacing	
Crusher-run rock aggregate	60 per cent
Miam chat	10 per cent
River sand	20 per cent
Blow sand	10 per cent

Dahlgren & Brooks had organized the production of mineral aggregate so that stockpiles were made in hot, dry weather. The stockpiles were built high and rounded to prevent the ponding or retention of rainwater. Several other contractors on the turnpike had to wrestle with much wetter aggregates than the Dahlgren & Brooks material, which contained only about 3 per cent

(Concluded on next page)

Highway power broom, pulled by a Massey-Harris tractor, cleans up the asphalt base course in preparation for the laydown. Dumped base-course rock is shown in the far background.

ROETH



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This is the Giant of small trucks—Giant in horsepower (156 HP Diesel)—Giant in structural strength—yet highly maneuverable. Turning radius less than 20'! It is exceptionally fast and powerful for an off-highway truck. Long, low stressed, 2-stage springs, front and rear, designed for proper shock absorbing qualities and maximum protection of truck and driver.

The new DART 10-S with air brakes and hydraulic steering fills a specific need for an extra-heavy truck in the 10-ton range. Whatever conditions you face—no matter how rugged they are—the new DART 10-S can meet your requirements of Service, Economy, and Low Initial Cost. For the price and specifications, see your local dealer or write to DART Truck Company.

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New Four-Lane Road Helps Congested Area

(*Continued from preceding page*)

moisture. The average daily plant output, based on figures covering approximately 88 per cent of the paving contract, was between 175 and 180 tons per hour.

Two Pavers Lay Material

The hot-mixed asphaltic concrete, delivered to the job by trucks, was laid by two Barber-Greene asphalt finishers, working practically side by side. Batch trucks capable of hauling eight tons were rented from independent owners on a ton-mile basis. Each load was weighed as it left the batch plant site.

Both Barber-Greene machines worked to string-lines established by surveyors. As a rule, the base course was laid two or three days ahead of the surface course. The paving crew included 2 operators, 2 screed men, 2 dump men, a tractor operator for the Massey-Harris machine and Highway power broom used just ahead of the laydown, a raker, 4 laborers, and a motor grader operator who stood by to perform miscellaneous dressing along the edges.

It was necessary to lay the asphaltic concrete from 3¾ to 3⅞ inches just behind the laydown machine in order to develop the 3-inch compacted thickness required by the specifications. The 2-inch surface course, on the other hand, had to be laid about 2⅝ inches behind the paver before it would maintain a 2-inch thickness within the limits of density. The base course was laid 24½ feet wide, while the top course was 24 feet in width.

The knockdown roll was delivered by a Buffalo-Springfield 6 to 8-ton steel-wheel tandem machine, and the finish roll was put on by an 8 to 10-ton Buffalo-Springfield.

One of the most important phases of the laydown work was the proper construction of end-of-day joints, where one day's run tied into the next. To make certain these joints were square and smooth, a Felker concrete saw with a diamond-tipped blade was brought in. The joints were sawed on the day following the laydown work.

An attempt was made to saw the joints while the material was still warm, but it was found that expensive saw blades would cut only eight or ten joints before they wore down. By delaying the sawing until the material had been compacted and cooled, blade life was increased.

Personnel

Contractor's operation for Dahlgren & Brooks were under the immediate supervision of four active partners in the firm: E. W. Dahlgren; his two sons, J. C. and W. E. Dahlgren; and Wayne Brooks. The Oklahoma Turnpike Authority is under the general managership of H. E. Bailey, former director of highways for Oklahoma. W. D. Hoback is chief engineer. THE END

The two strongest earthquakes recorded since the seismograph came into general use were the Assam-Tibet quake, August 15, 1950, and the Colombia temblor of 1906.

The Model CS-500 Champion concrete cutter.

Concrete-Cutting Saws

■ Two new concrete-cutting saw models have been announced by the Champion Mfg. Co., 2028 Washington Ave., St. Louis 3, Mo. Both models, designed for cutting all types of concrete and asphalt highways and streets, are also used for cutting joints in concrete flooring and for patching and trenching.

The CS-500 is equipped with a 14.6-hp air-cooled gasoline engine and has dual blade guards with 14-inch blade capacity. The CS-400 has an 8.4-hp engine and takes a 12-inch blade.

Both machines have dashboard controls, positive screw feed, depth lock, and run on rubber-tired wheels. The positive screw feed allows the blade to be easily lowered into or out of a cut.

For further information write to the company, or use the Request Card at page 18. Circle No. 399.

Planett Joins WRI

The Planett Mfg. Co., Los Angeles, Calif., has become a member of the Wire Reinforcement Institute, a trade association with headquarters in Washington, D. C.

The Planett firm, which has been manufacturing steel and wire products since 1921 and has produced welded wire fabric for reinforced-concrete construction work for the past 18 years, was admitted to the institute at the annual fall meeting in White Sulphur Springs, W. Va.

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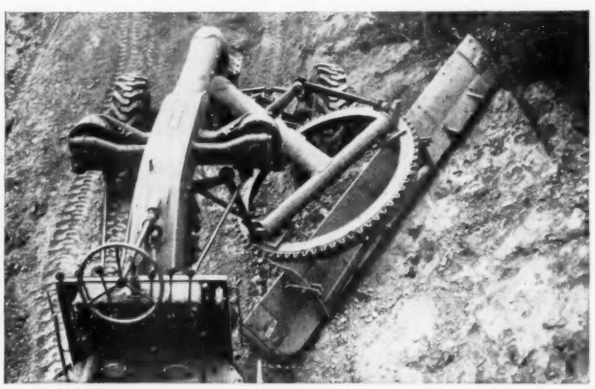
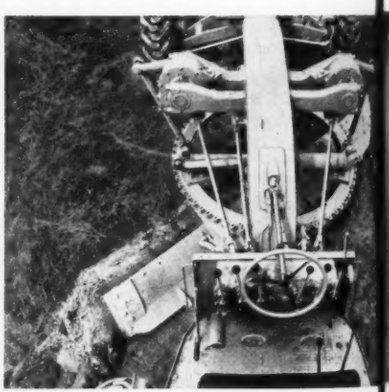


SLOPING— Look how much better you see . . . how much steadier your blade is with small control rods leading out to lift cases located directly over the circle.



SOD STRIPPING — Look at the tapered corners on this clean, wide platform . . . how they give unequalled view of heel of ROLL-AWAY moldboard.

In addition to letting you see better, the AD-40 offers feather-touch hydraulic power steering, hydraulic brakes . . . and true comfort for any size operator, sitting or standing. Look!

Line of Truck Shovels Features Attachments

■ A new and improved line of truck-mounted excavator cranes is announced by the "Quick-Way" Truck Shovel Co., 4150 Josephine St., Denver 1, Colo. The new models are rated at ½ yard for the L-2, 4/10 yards for the E-2, ⅓ yard for the S-2, and ¼ yard for the J-2. Crane capacities range from 3 to 10 tons. The new units are available with 5 booms: crane, shovel, trench-hoe, front-dump shovel, and scoop. Special attachments for the units such as the new hammer-drive clam, dragline, clamshell, magnet, pile-driver, log grapple, back-filler blade, telescoping boom, and skull cracker, can be used with these booms.

New features of the Models L-2 and E-2 include an all-steel cab with safety glass and 360-degree vision. New clutches are of the roll-in, self-energizing, reversible-shoe type. New brakes feature increased leverage, large pedals, and automotive-type brake-pedal action. A further improvement is a new set-back gantry of bridge-type all-welded construction that gives the operator greater ease and visibility in crane work.

The new "Quick-Way" Model L-2, one of a series of four models recently announced.

Improvements in Models S-2 and J-2 include clutches with increased fulcrum leverage.

A new control cabinet features independent, self-filling hydraulic cylinders on each control line. The manufacturer reports that only a slight pressure on the operating lever is required to transmit full power to the clutch.

For further information write to the company, or use the Request Card at page 18. Circle No. 433.

Publish Book on Design Of Reinforced Concrete

"Theory and Practice of Structural Design Applied to Reinforced Concrete", giving information from elementary statics to an analysis of indeterminate structures, has been published by Concrete Publications, Ltd. The principles discussed in the book apply to all elastic materials, and examples are directed mainly to reinforced concrete.

The method of fixed points, allowing a semigraphical solution to be obtained rapidly is explained in detail for continuous beams and frames. An appendix gives complete calculations for the analysis of a portal frame bridge with beams of varying depth supported on piled foundations. The book also discusses internal forces and stresses, simple beams and cantilevers, reinforced-concrete members, fixed frames and arches, and closed ..ames.

The book, written by B. Eriksen, contains 252 illustrations and 38 tables. It costs $5.50 and can be obtained from Concrete Publications, Ltd., 14 Dartmouth St., London, S. W. 1, England.

Rotating Hand Riveter

■ Literature is available on a portable riveter with spinning impact. The Airflex riveter has a straight-line pneumatic hammer that strikes against a rotating peen to distribute the impact around the rivet head. The operator may regulate the impact as to rapidity and force.

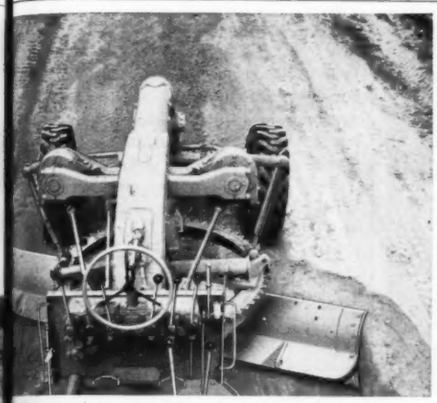
The SP riveter is available in a variety of models in sizes of ⅛ to 5/16 inch. The literature also illustrates an impact riveter for jobs not requiring rotating impact. These are made in 3/16 to ½-inch capacities.

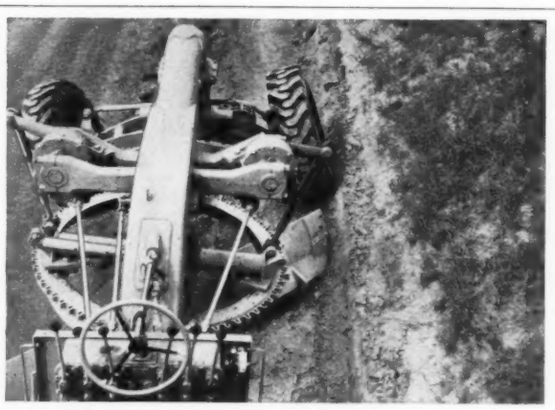
To obtain this literature write to the Lemert Engineering Co., Inc., Plymouth, Ind., or use the Request Card at page 18. Circle No. 378.

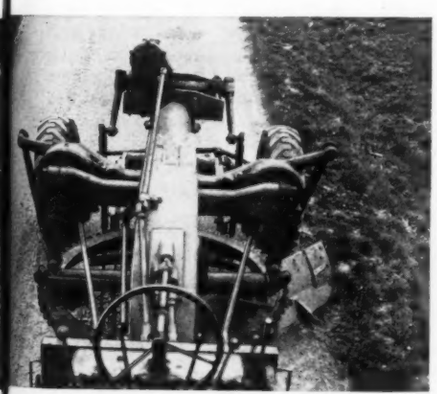
Literature on Motors

■ The recently announced General Electric line of Tri-Clad 55 motors, built in 1 to 30-hp ratings, is described in three new bulletins from the company. The booklets contain data on new maintenance and performance features of the line. Each booklet includes a doubled-spread cutaway drawing of the motors. The series covers drip-proof models, enclosed units, and the new gear motors.

To obtain this literature write to the General Electric Co., 1 River Road, Schenectady 5, N. Y., or use the Request Card at page 18. Circle No. 451.


GRADING — Look at that single member frame — it really lets you see what you're doing . . . means efficient grading on *any* job.


DITCHING — Look at the low control panel. It gives you a clear view of the blade . . . helps insure a clean, smooth ditch.


SCARIFYING — Look at the AD-40, even in scarifying, and you will see it means new, better grader visibility at all times.

• 104 bhp. • Six speeds forward, three reverse
• 23,000 lb. (with optional calcium chloride solution in rear tires — 24,800 lb.).

YES, the big, new AD-40 is designed for today's jobs and today's operators . . . brings new standards of performance to all users of motor graders . . . handles all grading jobs faster, better, easier. You owe it to your operators . . . and yourself to ask your nearby Allis-Chalmers dealer now for a demonstration and *see for yourself.*

ROLL-AWAY is an Allis-Chalmers trademark.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

One of the two piers that support the 500-foot continuous truss over the deepest part of the gorge.

High Bridge Spans Deep Mountain Gorge

A STRANGER to the site of Four Mile Fork Bridge aptly inquired: "Four miles long or four miles high?"

The span, a part of the 88-mile West Virginia Turnpike, is located about 30 miles south of Charleston and crosses a small stream, from which it takes its name, and a small unimproved road. It reaches from the south end of Standard Tunnel to bridge a deep gorge. It has a continuous truss span of 500 feet, two 250-foot side spans, two 84-foot approach beam spans, and a 49-foot approach beam on two abutments and five piers.

Bates & Rogers Construction Corp., Chicago, Ill., contractors for Standard Tunnel which adjoins the bridge project on the north, received Contract No. 12 for the substructure on a low bid of $257,999. The job called for piers and abutments of reinforced concrete. The American Bridge Co. has the contract for the superstructure.

Open excavation for the piers and abutments was a rugged job because of the inaccessibility of the locations. Access roads were dug out of the mountain sides with bulldozers and dynamite. More than 30 miles of road were required for both jobs.

Marion, Koehring, and Lima cranes comprised the fleet assigned to the piers and concrete plant. A dozer fleet for road and pier work consisted of two International TD-18's and a Caterpillar D7 and D8.

Test Boring Results

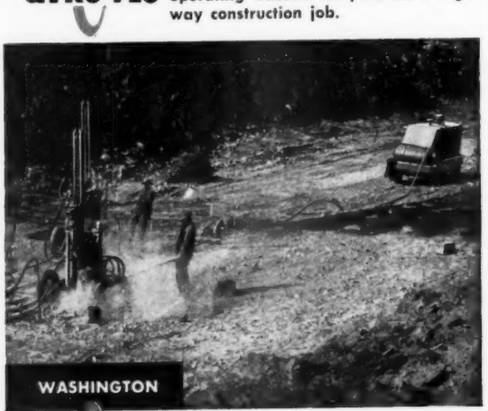
Although there was a plentiful supply of rock just beneath the surface, not all of it was suitable for bridge supports. Most of the spread footings for the pier columns required little forming, but some were almost 20 feet deep on the high side of the steep slope.

A sample of the formation may be taken from test borings at Station 1421 plus 95, between Piers 2 and 3. Excavation for Pier 2 was 18 feet 8 inches below the ground line at the high point, and the top 4 feet, from elevation 937.1 to 933.1, was soft gray clay. The next 4 feet

GYRO-FLO supplying air to two wagon drills in a quarry.

GYRO-FLO operating backfill tampers on a highway construction job.

GYRO-FLO supplying air to paving breakers on street repair work.



GYRO-FLO powering two wagon drills on a canal project.

here's why GYRO-FLO *Rotary* Compressors are first choice in Portable Air Power . . .

GYRO-FLO Portables are at the top of the list with hundreds of contractors because there are no valves to leak . . . no pistons, rods or clutch to wear. Discharge temperatures of less than 200°F mean longer hose life. "Air-Glide" capacity control takes the strain off engines by providing stepless regulation of engine speed and compressor output from 0 to 100%. The compressor is really matched to the higher speeds of GM diesels and Continental gasoline engines.

All four GYRO-FLO sizes, 105, 210, 315 and 600 cfm, have been proven on the toughest jobs all over the country. In blistering heat or bitter cold, at sea level or high altitudes GYRO-FLO Rotary Compressors have met every test.

The GYRO-FLO is smaller, simpler, lighter in weight and easier to maintain than any portable compressor ever built before. Your nearest I-R representative will be glad to give you the full story.

Part of the CONTRACTORS' COMBINATION . . . . Ingersoll-Rand

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"ALL WEATHER"
DECALS
FOR LARGE & SMALL NEEDS
Save 25% NO SALESMAN TO CALL YOU SAVE IT ALL
FOR PRICES AND SAMPLES WRITE TO
STORER DECAL CO.
1558 SO. MARKET, WICHITA, KANSAS
10 DAY DELIVERY

West Virginia Turnpike structure is 1,230 feet long; piers, abutments built of reinforced concrete

View of the construction from the south abutment. The black circle on the opposite mountainside is the mouth of Standard Tunnel.

was gray sand rock, ground water, a coal seam, and soft gray shale. A gray shale streaked with coal was just above the one-foot coal seam. Below the coal there was a 4 to 5-foot layer of medium-hard gray and brown sandstone and, at elevation 921.1, a hard gray sandstone was pierced for 4 feet 3 inches where the test hole bottomed at 917.8. The footing for Pier 2 was keyed a foot deeper into this rock. To give some idea of the slope problem, Pier 3's footing 256 feet down the hill is at elevation 798, 116 feet lower.

Forms

The forms, among which were a number of slip forms re-useable on pier columns, were built in the carpenter shop at the site. They were designed for a fluid pressure of 150 pounds per cubic foot and an additional live load of 50 pounds per square foot.

Vertical 2 x 6 logging, with the rough face against the concrete, and slight openings between boards, were used to obtain a rustic and fluted appearance. These were nailed to 2 x 6 studs set horizontally and to double 2 x 6 wales set vertically. Wales were separated by 2-inch blocks which provided a slot for the heavy steel rod ties.

Most exposed edges and corners were chamfered by inserting a planed triangular 45-degree strip in the forms. Columns were rusticated. The carpenter shop was equipped with a C. H. & E. gas-driven table saw and a 15-hp American saw mill.

Concrete Plant

The electric batch plant was keyed around a 122-cubic yard Butler four-compartment batch bin, loaded by a Hough Payloader, which dumped into the hopper of an 80-foot Webster bucket conveyor. Railroad cars were unloaded with a Barber-Greene portable belt-type aggregate car unloader. A Blaw-Knox cement bin held 100 barrels.

Other conveyors included a Kremser 30-inch x 40-foot belt conveyor and two Barber-Greene 24-inch x 60-foot belt conveyors.

Concrete was mixed in a 2-yard Smith tilt-type mixer for 1½ minutes, and output was dumped to three 4-yard Dumpcretes mounted on Hendrickson trucks which shuttled the loads in maximum 30-minute trips to waiting forms. A Koehring crane was assigned to the concrete plant, and a Lima crane

(*Concluded on next page*)

Jobs Done Quicker, Cheaper

Attached to Tractors, Bulldozers, Motor Graders and Scrapers, the Automatic Slope-Meters are in use on the construction of highways, airports, dams and building sites. Slope-Meters are compact, sturdily constructed instruments that will automatically show the operator the exact grade or slope on which he is working.

Order from Your Equipment Distributor Today
OR
THE SLOPE-METER CO. EXCELSIOR, MINN.

He Knows!

EXPERIENCE is the truest guide to production efficiency and economy... and experience in the excavating and construction fields proves that Roebling wire rope is your one top choice for avoiding delays, cutting down replacements and saving wire rope dollars.

All over the country, large numbers of experienced wire rope users definitely prefer Roebling wire rope. Call your nearest Roebling office or distributor for a Roebling recommendation.

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JOHN A. ROEBLING'S SONS CORPORATION, TRENTON 2, N. J. BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, N. J.

High Bridge

(Continued from preceding page)

was stationed at the job and swung the mix from Dumpcrete to form in one-yard Heltzel and Blaw-Knox buckets.

There was wide choice of electric vibrator equipment ranging from engine-driven to air and electric. There were five Maginniss electric vibrators available with several wheelbarrow-type Maginniss three-phase, 180-cycle, 120-kw generators. Air-powered Chicago Pneumatic vibrators were used.

Concrete

Concrete in piers, abutments, and footings was Class A with 3 to 6 per cent air entrainment, AASHO M134-48, with a 14-day strength of 3,000 psi.

Fine aggregate specifications were:

Passing	Silica Sand	Limestone Sand
⅜-inch	100	
No. 4	95–100	100
No. 8	80–95	90–100
No. 16	50–85	50–75
No. 50	5–25	10–30
No. 100	0–7	3–10

A one-cubic-yard batch contained six sacks of cement, 36 gallons of water, 1,290 pounds of fine aggregates, and 1,860 pounds of coarse composed of 2¾-inch-minus rock. Slump for mass concrete was 1½ inches minimum and for reinforced concrete, 2½ inches.

Piers 3 and 4

Piers 3 and 4 support the 500-foot continuous truss over the deepest part of the gorge. A sampling of the detail shows the difficulties of construction in this rugged area.

The west column footing of Pier 3 is 25 x 26 x 5½ feet reinforced concrete, with 55 No. 11 (1.410-inch) deformed bars on 5½-inch centers on the long dimension and 41 on 7¼-inch centers on the short. Each shaft is pinned to the footing with 27 No. 11 U-shaped dowels. The east footing for the longer 67-foot shaft is 25 x 27 feet. The east column is 55 feet 2⅛ inches high from the top of the footing to the top of the pier less the bridge pad at elevation 870.68. It is 11 x 14 feet at the base, tapering upward at a ½-inch batter to 9 x 8 feet at the top. The two shafts are tied together by a diaphragm 5 feet wide and 28 feet long.

The diaphragm or cap joins the columns at a construction joint set 11 feet 5¼ inches from the top of each column and has a depth of 8 feet in the center.

The west footing is at elevation 798 and the east footing, at 810, or 12 feet higher.

Other Piers

Piers 1 and 2 are on the south end where, along with the south abutments, they support the two 84-foot beam spans. Pier 1 sets on a 6 x 20 x 3-foot base in solid rock 15 feet below the existing ground line. It has a height of 28 feet 9 inches. The pier cap is 3 x 4 x 35 feet with an 8-foot 6-inch overhang on each side.

Pier 5, 49 feet from the wing-type abutment at the tunnel entrance, is only 10½ feet high and rests on a 13 x 6 x 3-foot footing. Pier 2 marks the transition from an 84-foot beam span and a 250-foot continuous truss span. It required a different type of footing to key it to the rocky slope. It consists of a 10 x 42-foot slab with an 11-foot thickness on one end and steps of 8 feet on the 14-foot part of the lengths. The remaining 21 feet has a 3-foot thickness with the bottoms of the offsets at elevations 916, 920, and 924.

The main part of the pier is 29 feet high from the top of the footing to the pads for the steel span shelf; total height of the pier is 61 feet 3⅝ inches.

North Abutment

The north abutment separates the bridge from the tunnel entrance. There are 13-foot 5-inch wingwalls on the 39-foot roadway with a total wingwall and roadway width of 66 feet. Bridge pads are at elevation 1,014.99 in the center; the crown slope is ⅛ inch to 12. Most construction joints are made with inclined reinforcement shear keys.

Quantities and Personnel

The quantities:

Earth excavation	1,900 cu. yds.
Rock excavation	3,300 cu. yds.
Porous fill	200 cu. yds.
Common embankment	200 cu. yds.
Concrete	2,858 cu. yds.
Reinforcing steel	205,000 pounds

Ray Cavendish is executive director for the West Virginia Turnpike Commission. C. H. Peterson is project engineer for Howard, Needles, Tammen & Bergendoff, New York City, turnpike engineers and construction supervisors, and E. V. Jones is resident engineer.

Bates & Rogers Construction Corp., is represented by M. C. Warmbier, general superintendent. THE END

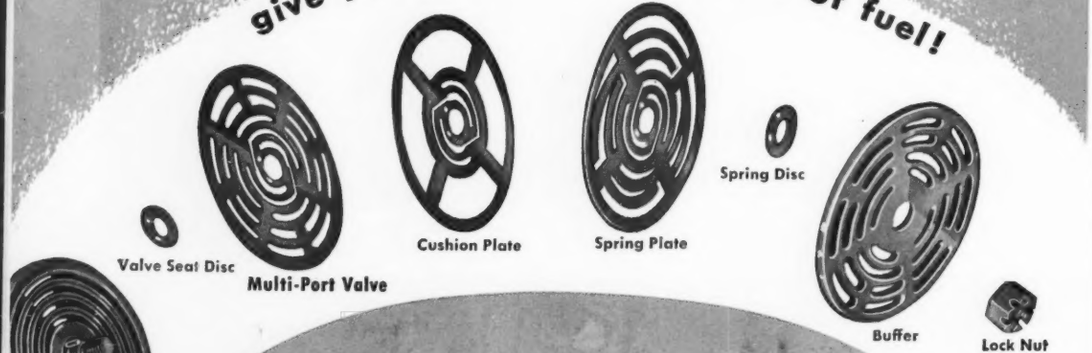
Lima Logging Film

A 16mm sound color film telling the story of the logging industry and showing Lima shovels and cranes in operation is available from the sales promotion department of the Baldwin-Lima-Hamilton Corp., Lima, Ohio. The movie, a narrative-type travelogue, is entitled "The Loggers' Giant".

Requests for the film should be on company or organization letterheads.

DAVEY COMPRESSORS with Multi-Port Valves

give you more air per gallon of fuel!



DAVEY Multi-Port Valve Assembly

Ask any owner of a new **Multi-Port Valve** Davey. He'll tell you that he is getting more air from less fuel than he ever believed possible.

Davey's new **Multi-Port Valves** set new standards of economical compressor operation. In addition, they never carbon or foul . . . do not require replacement, assure constant full air volume, keep tools operating at peak efficiency.

A-7318

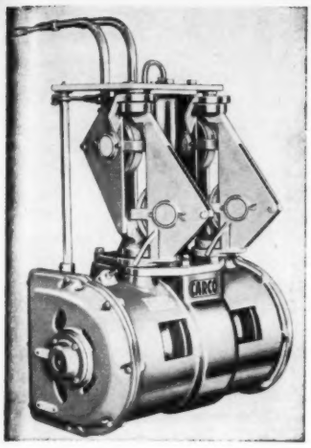
Super Chief Model 210 is one of the most popular Daveys . . . possesses tremendous reserve power . . . is equipped with large air tool storage boxes. It is lighter in weight and possesses smaller over-all dimensions than any other standard 210 c.f.m. unit available today.

DAVEY

pioneers of "air-cooled air"

Ask your Davey Distributor for data on standard 60 to 600 c.f.m. Davey portable and industrial compressors; "Auto-Air" (truck-mounted) compressors; Mobile Machine Shops and Field Service Units.

DAVEY COMPRESSOR CO. • KENT, OHIO



Power-Control Unit

■ A new double-drum power-control unit is announced by the Pacific Car & Foundry Co., Fourth and Factory Streets, Renton, Wash. The Carco unit with double swivel fairleads, is available for all makes and sizes of industrial tractors.

The power package features one-lever control, constant-mesh gear train, multiple-disk clutch, and differential-type brake. The manufacturer points out that with controls under one hand, the operator can work more efficiently. The rear-mounted control unit is designed for use with either a scraper or dozer.

For further information write to the company, or use the Request Card that is bound in at page 18. Circle No. 432.

Acid-Resistant Cement

■ A chemical-resistant cement that will set in contact with concrete or steel even under adverse conditions without the use of acid or alkaline setting agents is announced by the Atlas Mineral Products Co., 42 Walnut St., Mertztown, Pa. Vitroplast, a new vinyl-base cement, is said to be resistant to hydrochloric acid, phosphoric acid, 60 per cent sulfuric acid, 5 per cent nitric acid, 5 per cent chromic acid, sodium hypochlorite, benzene, gasoline, and chlorine dioxide at temperatures up to 150 degrees F. It has a working time of about 40 minutes and a setting time of less than two hours at ordinary temperatures. It is available as a white bleach-resistant cement.

For further information write to the company, or use the Request Card that is bound in at page 18. Circle No. 363.

Data on Tractor Shovels

■ The versatility of the Caterpillar No. 6 shovel is emphasized in a booklet from the Caterpillar Tractor Co., Peoria 8, Ill. The booklet also points out that both this unit and the earlier model HT-4 front-end shovel are not tractors with hydraulic shovels attached, but are built as integral units. According to the text, the welded box section frame of the shovel prevents bucket twisting and excessive hinge-pin wear.

To obtain this literature write to the company, or use the Request Card that is bound in at page 18. Circle No. 419.

M-C&S Brochure Issued

The role played by construction in virtually every phase of man's daily life is underlined in a new brochure, "This Is Merritt-Chapman & Scott". The publication illustrates the various types of work done by the corporation and emphasizes that it is construction which provides the physical facilities for advances in the fields of industry, commerce, transportation, and the social services.

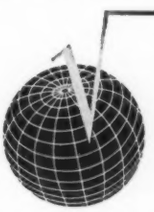
Almost every type of project is reviewed in the brochure, which explains the 93-year-old company's scope of construction services, from initial financing to project completion. The corporation's work on bridges, tunnels, waste disposal utilities, piers, docks, pipelines, dams, hospitals, and industrial establishments is shown. Also illustrated are some representative marine salvage and derrick heavy-hoisting operations.

Copies of the brochure can be obtained by writing to Louis E. Wolfson, president and chairman of the board, at the company's general offices, 260 Madison Ave., New York 16, N. Y.

Sika Opens Branch Office

The Sika Chemical Corp., Passaic, N. J., manufacturer of products for concrete construction and maintenance, has opened a western branch sales office in Salt Lake City, Utah. H. C. Jessen, a licensed professional engineer and land surveyor, will manage the new office.

Be Sure of Your Subsurface Information



SUBSURFACE SURVEYS, a division of The Institute of Industrial Research, obtains for you time-saving subsurface information that is dependable. . . . With our modern, refraction seismographic service, together with standard-type boring methods, we solve difficult subsurface problems — anywhere.

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Box 139, Syracuse 10, N. Y., Phone: 4-6454

BARNES PUMPS HELP HANDLE SEEPAGE ON GIANT CANADIAN HYDRO PROJECT!

5,500 men working on day and night shifts — two 5½-mile-long supply tunnels, 45-ft. in finished diameter, extending under a densely populated area . . . a 2¼-mile canal designed to carry 40,000 c.f.s. . . . a new power house with installed capacity of 1,200,000 h.p. . . . an expenditure of $300,000,000 — these are highlights of the gigantic project now under way at Niagara Falls which is being rushed to completion by The Hydro-Electric Power Commission of Ontario to meet the growing demands for power in a booming industrial area.

When completed in 1956, this generating station located in the side wall of the Niagara gorge and six miles below the Falls, will stand as another sound engineering achievement attesting to the progressiveness of The Hydro-Electric Power Commission of Ontario and the manner in which it meets its obligations as a public servant.

The Barnes Manufacturing Co. is honored to have its pumps selected for the important work of helping control surface and seepage water in the construction of this project.

Barnes 90M Self-Priming Centrifugal Pumps Operate 24 Hours a Day in Helping to Control Surface and Seepage Water in Canal Section of Vast Hydro-Electric Power Commission's Sir Adam Beck-Niagara Generating Station No. 2.

BARNES MANUFACTURING CO.
MANSFIELD, OHIO **OAKLAND 21, CALIF.**

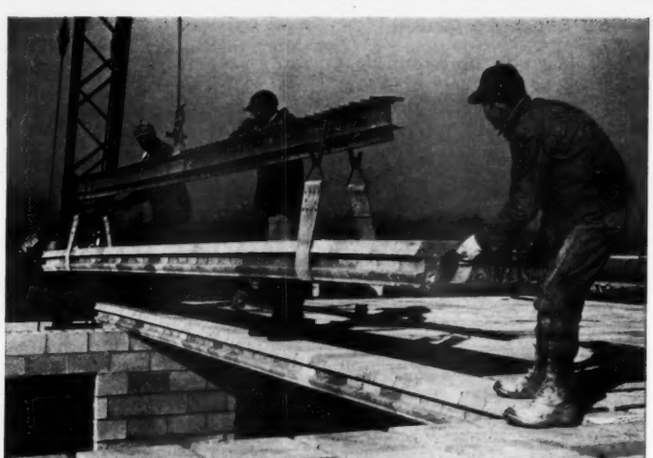
Barnes — Founded 1872 — Manufacturing Co. — Mansfield, Ohio

★ ★ ★ BUY THE BEST . . . BUY BARNES ★ ★ ★ ★

Concrete Blocks Joined With Reinforcing Rods Make Structural Beams

■ Reinforced beams made of joined precast concrete blocks are available from the Rapidex Co. of Indiana for road and floor construction. The 16-inch-wide beams are delivered ready for use in lengths up to 29 feet. The beams are set in place as they are unloaded from the truck with no intermediate handling. When the beams are assembled with joints properly grouted, the entire deck area becomes an integral unit.

The manufacturer reports that the finished slab is light in proportion to its strength. For example, an 8-inch-thick beam weighs 42 pounds per square foot, and a 6-inch-thick beam weighs 30 pounds per square foot. Other advantages are an attractive, finished appearance, good light-wave dispersion, resistance to deterioration, excellent acoustical properties, and resistance to fire. The surface is also said to provide an excellent bond for cement toppings. The core holes in the slabs offer additional economy, as they may be used for heat ducts, as cold-air returns, and for concealing piping and conduit.



Rapidex sections, made of joined concrete blocks, are assembled to make roof slab.

Fabrication of the beams at the factory involves casting the individual blocks, grinding the compression faces, and assembling the blocks with all holes aligned. Steel reinforcing rods are centered in the two bottom core holes, and high-strength concrete grout is pumped under pressure through the holes to embed the steel. Allowances for dead-load deflection can be made at this point by pre-arching the slabs with resulting longer spanning ability. An 8-inch beam with two 1-inch-diameter steel reinforcing rods will carry a live load of 59 pounds per square foot on a 29-foot span. The manufacturer points out that the need for intermediate structural framing is eliminated in many instances. Labor on the job is also reduced by the elimination of the shoring, forming, and reinforcing needed in solid-slab construction.

For further information, write to the Rapidex Co. of Indiana, Division of Spickelmier Co., 1110 E. 52nd St., Indianapolis 5, Ind., or use the Request Card at page 18. Circle No. 447.

Managers for Thew Shovel

The Thew Shovel Co., Lorain, Ohio, has appointed R. G. Thibaut as service manager and C. W. Raby as his assistant. Mr. Thibaut succeeds the late R. P. Kelly.

Assistant service manager since 1936, Mr. Thibaut will now be responsible for the servicing of Lorain equipment in the field throughout the world.

NO OTHER SMALL TOW TYPE ASPHALT PAVER gives you these advantages!

Anti-Friction Bearings throughout.

Hopper equipped with agitator Raker Bar for full down compaction.

Dual Controls assure greater accuracy of course thickness.

Demountable Trailer Hitch eliminates any need for trailer.

Continuous Course Correction reduces irregularities with each successive course.

Power for self-maneuvering, cuts time lost in relocation.

Overlapping Cutter Bar action carries material up to parallel joint and makes tight, compact joint.

Oscillating Cutter Bar cuts off material without troweling fats to surface.

PUTTING DOWN ROADWAY IN A LARGE CHICAGO CEMETERY.

LAYING A PARKING LOT IN NEW JERSEY

HERE, for the first time, is a precision Black Top Paver in a small package! The advantages listed above can be had in no other machine of this type. These advantages combine to give you a better job on those parking lot, driveway and playground contracts. They mean faster spreading, less time lost in relocation and greater accuracy of control. Look over these and the other Adnun advantages. Ask for details and plan on the new Adnun Jr. Model 8 for non-specification work.

ADNUN JR MODEL 8 BLACK TOP PAVER

BLAW-KNOX COMPANY
FOOTE CONSTRUCTION EQUIPMENT DIVISION
1916 STATE STREET, NUNDA, NEW YORK
BLAW-KNOX

BEST BUY... PORTABLE HEAT

Costs So Little

The Hy-Lo Salamander has the greatest heat output—up to 140,000 BTU per hour. Low cost permits greater flexibility — gives you the right amount of heat where you want it —the Patented Return Gas Stack principle assures you of clean heat and eliminates frequent cleaning. The only Salamander equipped with extinguishing damper — carrying handles and cover to bowl clamps.

Get complete HY-LO FACTS NOW!

HY-LO OUTSELLS ALL OTHERS

Distributors in all principal cities — write or wire for nearest distributor.

Scheu Products Company
Upland, California Warehouse: Chicago

Wheel Lugs Improve Tractor-Tire Grip

■ Traction lugs that attach to the rear wheels of pneumatic-tire tractors are announced by the Baraboo Mfg. Corp., Baraboo, Wis. According to the manufacturer, the lugs provide up to 160 per cent increase in drawbar pulling power. They are used to increase traction in mud, snow, marshes, sand, on ice, and on hills.

While the Miracle Traction lug extends out to 3½ inches beyond the tractor tire, there is no rubbing or wear on the tire itself. It reportedly increases the life by about 400 per cent. The lug becomes a permanent part of the wheel when attached. A set is mounted on a ring with a strong steel spring and lock that hold the lugs in position. They can be snapped shut to the center of the wheel when not in use.

The lugs fit all wheel-type tractors with 28 or 38-inch tires; the manufacturer reports other sizes will be available later.

For further information write to the company, or use the Request Card at page 18. Circle No. 413.

New Plastic Pipe

■ A rigid, glass-fiber, reinforced-plastic, polyester resin pipe said to resist corrosion indefinitely is announced by the Reflin Co., Gardena, Calif. The company claims its pipe may be used in many stainless-steel pipe applications.

The pipe comes in diameters ranging from 4 to 10 inches and is suitable for temperatures from minus 90 to 230 degrees F. It is said to be nearly inert chemically, with no tendencies to cold-flow. The seamless interior wall surfaces are made to discourage attachments of mineral and biological deposits.

For further information write to the company or use the Request Card at page 18. Circle No. 452.

Line of Roll Crushers

■ Roll crushers for secondary crushing are shown in literature from the Lippmann Engineering Works, 4603 W. Mitchell St., Milwaukee 14, Wis. Standard sizes of roll crushers made by the company range from 16 x 16 to 72 x 24 inches.

Cutaway drawings are used to illustrate components of the machines. Engineering data provided includes size of product and feed, speed of rolls, and output capacities.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 453.

First-Aid Supplies

■ An all-weather first-aid kit made in a new design and with improved packaging features is announced by the Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh 8, Pa. A special color identification system is used for the packaged materials.

All individual unit packages have simplified, fully illustrated instructions in large clear type. The manufacturer reports the first-aid items, from inhalants to bandages, rigidly follow pharmaceutical standards.

For further information write to the company, or use the Request Card that is bound in at page 18. Circle No. 414.

DON'T LET THIS HAPPEN TO YOU!

Protect Your Investment With

FlameZel®
Treated by WenZel
Fire, Water & Mildew Resistant
TARPAULINS

FlameZel Tarpaulins meet the fire resistant requirements of Federal Specifications CCC-D-746. Manufactured under Wenzel Patents No. 2286744, No. 2436216, No. 2463983 and others.

EXTRA STRENGTH AT NO EXTRA COST!

Now all FlameZel Tarpaulins and Windbreaks are equipped with heavy duty rope bound in edges all around. Prevents rips and tears from starting; grommets won't pull out.

FlameZel Tarpaulins and Windbreaks available for IMMEDIATE DELIVERY from distributors in all principal cities. Mfd. by H. Wenzel Tent & Duck Co., St. Louis 4, Mo.

Aerial view looking south across the Strait of Mackinac. Merritt-Chapman & Scott and Bechtel project offices are at lower right.

Twin Pipelines Cross Deep Four-Mile Strait

Twenty-inch pipe is welded together on shore and pulled into place by steam-powered winch

By RALPH MONSON, Field Editor

Two Allis-Chalmers HD-19 tractors with Berg side booms lower a string of pipe into the launching way. *C. & E. Photo*

THE LAYING OF TWO 20-inch pipelines in water up to 250 feet deep under the 4-mile-wide Strait of Mackinac, believed to be the longest and deepest underwater crossing ever constructed with pipe of this size, was recently completed. The job was done by the Great Lakes Division of the Merritt-Chapman & Scott Corp., New York City and Cleveland, Ohio, for the Lakehead Pipe Co., Inc., Superior, Wis. The project was planned and supervised by the Bechtel Corp., San Francisco, Calif., agent for the owners.

The "Twin Twenties" are a vital link in the 643-mile Lakehead Pipeline Extension which connects the lakehead ports of Duluth, Minn., and Superior, Wis., with Sarnia, Ontario, at the southern tip of Lake Huron. With the completion of this extension, oil from the rich Canadian wells in Alberta will be able to flow to the refineries all year round, uninterrupted by the five-month shutdown of shipping on the Great Lakes.

Pipe Assembly

While dredges were preparing a channel in the lake bottom, launching ways were constructed at Point la Barbe on the north shore. The ways extended inland from the lakeshore approximately a half mile on the extension of the center lines of each strait crossing. Two such launching ways, spaced approximately 1,300 feet apart, were used to assemble and place the pipe.

The 20-inch pipe has a 13/16-inch wall thickness and weighs 166 pounds per foot. Each joint is a random 27 feet weighing an average of 4,592 pounds. Pipes were assembled on the launching ways in sections 2,500 feet long. Sections ready for launching weighed almost 2,000 tons.

As one section was launched, another section was set in place on the launchers and welded to the first. The process continued until eight sections were in place and one barrel of the crossing completed. Launching equipment was then moved to the other ways and the second barrel was placed in the same manner.

Preparing Launching Ways

The flat, swampy area selected for the launching ways was covered with a dense growth of trees and brush which was cleared by grading crews with chain saws and dozers. Super C Tournapulls leveled the areas and hauled in enough rock and granular material to make a stable base on which the launching equipment could rest. An International TD-9 tractor with Pullman Standard dozer leveled the fills and base materials as they were delivered.

At the far inland end of each launching way, an anchorage was constructed for the hold-back winch used to keep tension on the pipe as it was pulled into the water. Four 14-inch WF steel piles driven 50 feet into the sand in the shape of a huge double X served as deadman. Eight plumb piles and four battered piles of the same type provided foundation for the engine and winch base.

A Bay City crane using a Vulcan 50-C steam hammer drove the piles. Steam was supplied by a Littleford Bros. boiler. On this foundation, a steam-powered winch capable of a line pull of 50 tons was installed. Duplicate anchorages were constructed on the two ways with the holdback engine being moved to the second location after the first line of pipe had been placed.

Coating and Wrapping

Pipe for the crossing was assembled, coated, and wrapped in the same manner as pipe to be laid in the ground. A coat of whitewash over the dark outer wrapping minimized the heating effects of the sun as the sections lay on the ways awaiting launching.

Preparation of the pipe was sublet to Midwestern Constructors, Inc., Tulsa, Okla., who also installed the St. Clair River crossing from Port Huron to Sarnia and a 97-mile section of the pipeline immediately west of the straits crossing.

The random 27-foot lengths of pipe were swung into place by Allis-Chalmers HD-19 tractors with Berg side booms. While an internal clamp held the two pipes in perfect alignment, the initial weld was made. A timber crib was then placed under the pipe to hold it up

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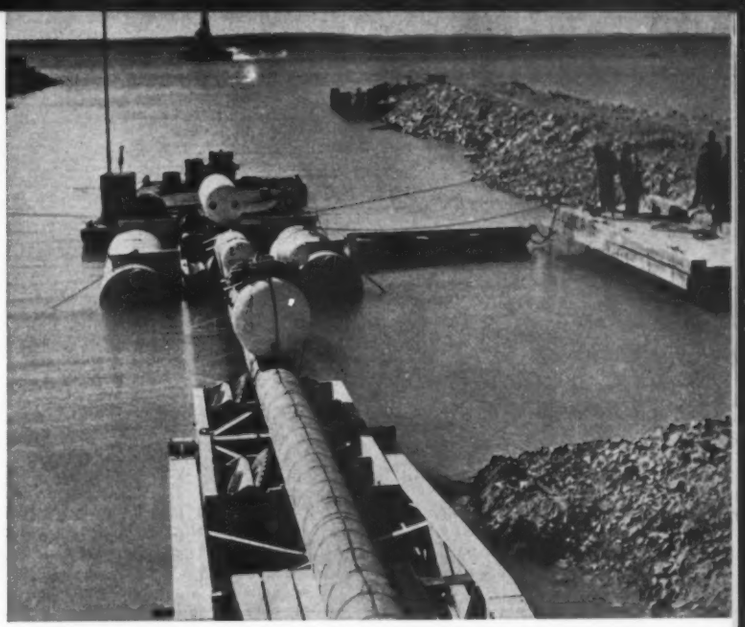

First section of the east line pipe just before launching operations from the St. Ignace side began (above) and just after they began (below). Buoys ride the pipe at regular intervals to keep it from immediately sinking to the bottom.

Looking south from the Green Island dock. In the foreground is the specially constructed pipe launcher. The floating equipment fleet is docked because of a threatening windstorm.

A Bay City crane with a Vulcan No. 5 hammer drives steel WF piles to form a giant X which will serve as a deadman for the 50-ton hold-back winch. *C. & E. Photo*

Twin Pipelines Cross Deep Four-Mile Strait

(Continued from preceding page)

off the grade as a series of welders applied bead after bead until the weld was complete.

The dope crew then took over. Using a Crutcher-Rolfs-Cummings cleaning and priming machine, it removed all foreign material from the outside of the pipe and applied the primer. Tractors with side booms cradled the pipe and set the cleaning and priming machine in place. The machine's rotating knives and wire brushes cleaned the pipe. The cold primer was applied and spread by brushes and a priming rug as the machine propelled itself along the pipe.

A CRC coating and wrapping machine followed closely behind, also traveling on the pipe. CRC insulated dope pots mounted on Athey track wagons and pulled by the cradling tractors accompanied the coating and wrapping machine supplying the dope at 460 degrees F.

The coating and wrapping machine pumped the hot dope from the tank and sprayed it on the pipe. A first wrapping of fiber-glass mat was applied over the dope, and a second wrapping followed immediately. As one of the 2,500-foot sections was wrapped, the side-boom tractors picked the machines off the pipe and set them on the next section for the return trip.

This standard coating and wrapping would normally be sufficient protection for the pipe. However, the pipe had to be pulled along the lake bottom, so an extra protection was required to prevent damage to the wrapping. This consisted of 1 x 3 wooden slats, covering the bottom third of the exterior of the pipe, attached with metal bands.

Dredging the Trench

In February, 1953, while the strait was still covered with a heavy sheet of ice, Merritt-Chapman & Scott survey parties started sounding and boring the bottom to determine the profile and the nature of the materials. A Bludworth sonic sounder proved a great time saver in charting the rugged bottom.

Surveys indicated the first 1,000 feet of trench from each shore would be in solid rock and the next 4,000 feet, in sand. At about 5,000 feet from each shore, the water reached a depth of 65 feet or more, and no further trenching was required. In the center section, the bottom drops on about a 10 per cent grade to a depth of almost 250 feet. The material here is a red plastic clay. The only dredging done in this material was the removal of some humps which would have created an excessive strain on the pipe.

M-C&S assembled a fleet of dredging equipment consisting of

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three clamshell dredges with 4 and 4½-yard buckets, two dipper dredges of 9 and 12-yard capacities, a 26-inch hydraulic dredge, a drill boat, and the many other craft required to keep the dredges operating. Before this fleet could go to work, however, it was necessary to construct a temporary harbor with docks and causeways to accommodate loading of supplies and personnel. In all, eight rock causeways were built, two at each end of each center line.

The 26-inch Bucyrus-Erie hydraulic dredge cut a channel 20 feet deep and 200 feet wide through a sandbar about 2,000 feet offshore from the launching ways. It then deepened an area between the ways and a nearby island to 20 feet to provide a sheltered harbor.

The drill boat moved in and drilled and blasted the rock bottom of the first 1,000 feet of each end of each line. Blasted rock was removed by a Manitowoc 3500 Speedcrane and dragline bucket where the water was shallow and by dipper dredge in deeper water.

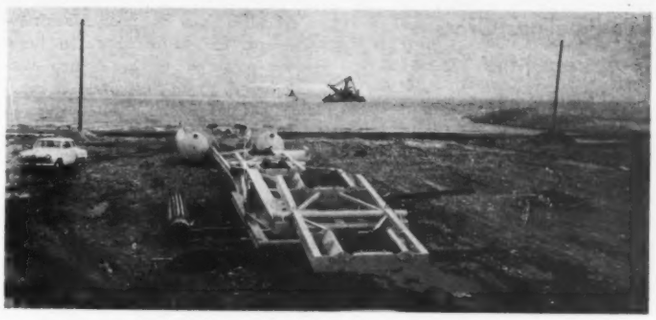
Trench section in both sand and rock was 17 feet deep, providing a minimum of 15 feet of cover over the pipe. In areas where sand flowed back into the trench, it was widened to as much as 60 feet. In shallow areas, the dipper dredges were able to cast some of the material to the side to be used in backfilling the trench.

All other trench excavation was loaded into bottom-dump scows which were towed to a disposal area and dumped. Four scows, having capacities of 1,500, 1,200, 800, and 750 cubic yards respectively, were used. Five tugs were used to handle the scows and tend the dredges, and four crew change boats transported operating personnel from the harbor to the dredges. Operating 24 hours a day and seven days a week, the crew of approximately 260 men moved an average of 22,000 cubic yards of material per day.

Actual dredging started May 15, 1953. Rough seas and fog caused several delays. In the first month and a half of dredging, weather was so rough that only two full 24-hour days were worked without interruption.

Weather and water conditions were recorded and reported continuously by the contractor's own facilities. A weather-reporting station measured direction and velocity of wind which are major factors governing current in the straits. Daily current measurements indicated flows of from ¼ to 1½ miles per hour velocities. An automatic water gage gave continuous readings of the water elevation.

Keeping the dredges on exact alignment was particularly important, not only to keep the pipe straight, but to avoid disturbing a very important submarine telephone cable which lies between the two pipelines. An elaborate system of cutoff ranges marked off the distances, and powerful, fog-penetrating electric range lights helped the dredges stay on line.



The pipe launcher which guides the pipe from the end of the launching way into the trench. It rests partly in water when in use. *C. & E. Photo*

Survey platforms were built on steel towers at irregular intervals along the line. Some of these towers were as high as 95 feet with 75 feet or more below water. Communication between survey platforms

(Continued on next page)

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MORE CHEVROLET TRUCKS IN USE THAN ANY OTHER MAKE

Twin Pipelines Cross Deep Four-Mile Strait

(Continued from preceding page)

and dredges was by Motorola short wave radio.

Each piece of marine equipment was supplied with a two-way short wave radio. In all, 16 stations were being operated. This system greatly facilitated communications, especially in rough and foggy weather when visual communication was impossible.

Launching and Laying

While the dredges were preparing the trench in the lake bottom, preparations were made on the launching ways for the placing of the pipe. The launching units were rented from the Collins Construction Co., Houston, Texas.

At McGulpin Pt. near Mackinaw City on the south shore, a huge steam-powered towing winch was assembled. From the winch, a cable was laid across the strait bottom to the launching ways on the north shore.

The derrick barge Cherokee, equipped with a 100-ton crane, laid 22,600 feet of 2-inch cable in the trench. The cable was made up in 2,500-foot sections with every other joint equipped with a Miller swivel to take out the twist. To keep the cable from burying itself in the mud of the bottom, it was fitted with positive buoyancy mandrels at each joint.

The heavy-walled pipe has a negative bouyancy of 32 pounds per foot when submerged empty. To lighten this load for easier pulling, the pipe was fitted with Collins pontoons which reduce the negative bouyancy to five or six pounds. These pontoons have a patented trigger release which makes it possible to release them from the surface after the pipe is placed. Releasing mechanism and all pontoons were rented from Collins.

On the ways, the pipe ready for launching was placed on a series of small Collins launchers called monkey rollers. These consist of a steel frame mounted on a base like a low teeter-totter. At each end of the frame are three pneumatic-tired wheels which cradle the pipe and on which the pipe rolls as it is launched. At the water's edge, a larger, much more complicated Collins floating launcher was installed to guide the pipe into the trench as it left the ways.

When all preparations were complete, the 2-inch cable was attached to the first section of pipe. On the south shore, the 50-ton Johnson pulling winch with a two-part line eased the long string into the water. The 50-ton winch at the north end of the launching ways applied enough pull to keep the pipe straight and in line. As the end of the first 2,500-foot section reached the last launcher, the HD-19 tractors set the next section in place. The two were welded together, the joint coated and wrapped by hand, and the entire process repeated.

When both pipes of the crossing were in place, their ends were welded into the manifold which joins them to the 30-inch pipe at each end, and the line was ready for use.

Personnel

Approximately 260 men were employed on the M-C&S payrolls with another 80 or more working for subcontractors. Transportation of workmen from St. Ignace to the job site was by special bus. Since many of the men were employed on the marine equipment, it was necessary to use four crew-change boats to transport them from the dock to the floating equipment.

Supervisory personnel for Merritt-Chapman & Scott project were Sherman H. Serre, vice president; Joseph S. Troxell, project manager; Captain John Tooker, superintendent of pipe pulling; Donald McGregor, superintendent of dredging; Russell Candler, superintendent of tugs and equipment; and William G. Ryan and James Suprenant, project engineers.

General superintendent for Midwestern was William Wilhitte. For Collins, French Glascock was superintendent.

Representing Lakehead were R. E. Trammell, vice president and general manager; F. J. Stubbs, assistant general manager; and Roger Clute, chief engineer. E. F. Quiett was construction manager of Bechtel's northern division. Also representing Bechtel were Clark Rankin, project manager; V. R. Stirling, assistant construction manager; and John Long, superintendent. THE END

Cellular Glass Insulation

■ A new folder on a cellular glass insulation for pipe is available from the Pittsburgh Corning Corp., One Gateway Center, Pittsburgh 22, Pa. Job installation photographs point out the advantages of Foamglas when used with pipe temperatures between minus 300 degrees and plus 800 degrees F. The folder contains a complete listing of the physical properties of the insulation and condensed recommended specifications.

To obtain this literature write to the company, or use the Request Card that is bound in at page 18. Circle No. 417.

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Fig. II Stadia hair arrangement for our standard transits.

Fig. III Special stadia hair arrangement, furnished upon request.

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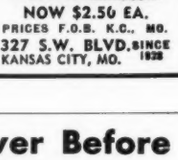

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The distributor speed, which determines the width of the spread, is regulated by controls in the truck cab. The fifth-wheel friction drive that starts and stops the feed mechanism is controlled by a hydraulic cylinder, also located in the cab. A split-bottom dump allows the spreader body to be utilized for many of the general uses of a dump truck. The spreader is available in three body styles.

For further information write to the company or use the Request Card at page 18. Circle No. 345.

Concrete-Breaking Tool

■ A moil-type tool for concrete breakage is announced by Brunner & Lay, Inc., 9300 King St., Franklin Park, Ill. The manufacturer explains that the blade sets up a wedge-like action that shatters the concrete while the tapered point rides free during the breakage. The point is said not to stick and to stay sharp longer.

Sabur points are made of a special steel for resistance to wear and shock. They are offered in two sizes, both with hexagonal shanks. One size is 1⅛ x 6 inches, and the other, 1¼ x 6 inches; both are 16 inches under the collar.

For further information write to the company, or use the Request Card at page 18. Circle No. 418.

Cleaver-Brooks Appoints

E. C. Uecker is now sales manager of the water distillation division of the Cleaver-Brooks Co., Milwaukee 12, Wis., manufacturer of boilers, distillation equipment, and other heating and evaporation units.

Mr. Uecker's assistant is H. E. Holbrook, who will assist in the direction of sales and service functions of the division.

Flexible Metal Hose

■ A variety of flexible metal hose products is illustrated in literature from the Universal Metal Hose Co., 2133 S. Kedzie Ave., Chicago 23, Ill. Among items illustrated is a seamless all-metal flexible pressure hose made in bronze, carbon-steel, or stainless steel from a corrugated all-metal base tube. The hose is recommended for steam, oil, or liquefied gases conveyed under pressure, vacuum, and constant motion or vibration.

Other sections of the booklet show interlocked asbestos-packed high-pressure hose, and interlocked suction, blower, and conveyor hose. The asbestos-packed hose handles steam, oil, hot tar, or asphalt.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 377.

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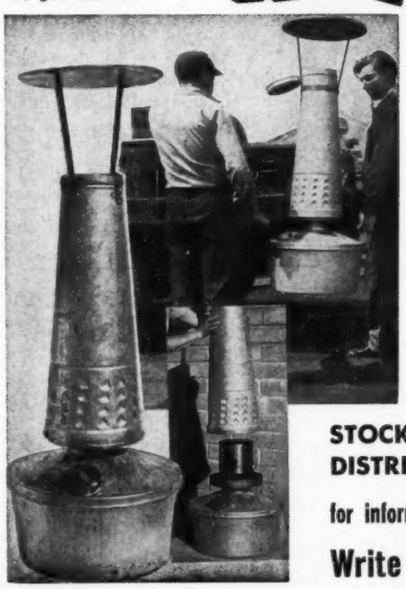

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Truck-Mounted Hoist Lifts Concrete Blocks

■ A new truck-mounted hoist that has a two-prong fork for lifting concrete blocks is announced by the Wm. Bros Boiler & Mfg. Co., 1057 Tenth St., S.E., Minneapolis 14, Minn. The Magic Muscle electrically powered hoist travels on a monorail boom mounted on the truck bed behind the cab and is operated by two push buttons on the lifting column. The unit fits all truck and trailer beds with lengths from 12 to 27 feet. Capacity of the material handler is 500 pounds per lift.

Used for lifting concrete blocks, the hoist offers a reduction of handling time; protection against breakage, corner chipping, scarring, and soiling of concrete blocks; and safety in operation. Besides concrete blocks, it handles crates, lugs, barrels, drums, palletized materials, sacks, bags, bales, and boxes. Cradles and scoops for other uses are also available.

The Magic Muscle uses a two-prong fork to lift concrete blocks.

For further information write to the company, or use the Request Card at page 18. Circle No. 454.

One-Lever Transmission Gives 8 Speeds Forward

■ Drivers of highway rigs in the 125 to 160-hp engine class—those delivering up to 385 pound-feet of torque—are now able to use eight speeds forward with a new one-stick no-gear-splitting transmission. The new unit, the Fuller R-45, is the latest addition to the series of RoadRanger transmissions developed by the Fuller Mfg. Co., Kalamazoo, Mich.

The eight forward speeds are secured by using a four-speed shifting pattern twice, the first time with the auxiliary section in low gear, or low range, and the second with the auxiliary section in high gear, or high range. The new transmission has a synchronized electric-air-power shift between ranges, actuated by a button on the shift lever by which the operator can preselect the desired range. The synchronized range shift occurs automatically as the shift lever moves to the neutral position.

The manufacturer points out that the new transmission results in ⅓ less shifts for the operator, with gear-splitting eliminated and rpm loss between shifts minimized. Engine lugging is reduced, and more weight can be carried over the payload axle. Highway speeds can be maintained on hills and in dense traffic with greater fuel economy.

For further information write to the company, or use the Request Card at page 18. Circle No. 354.

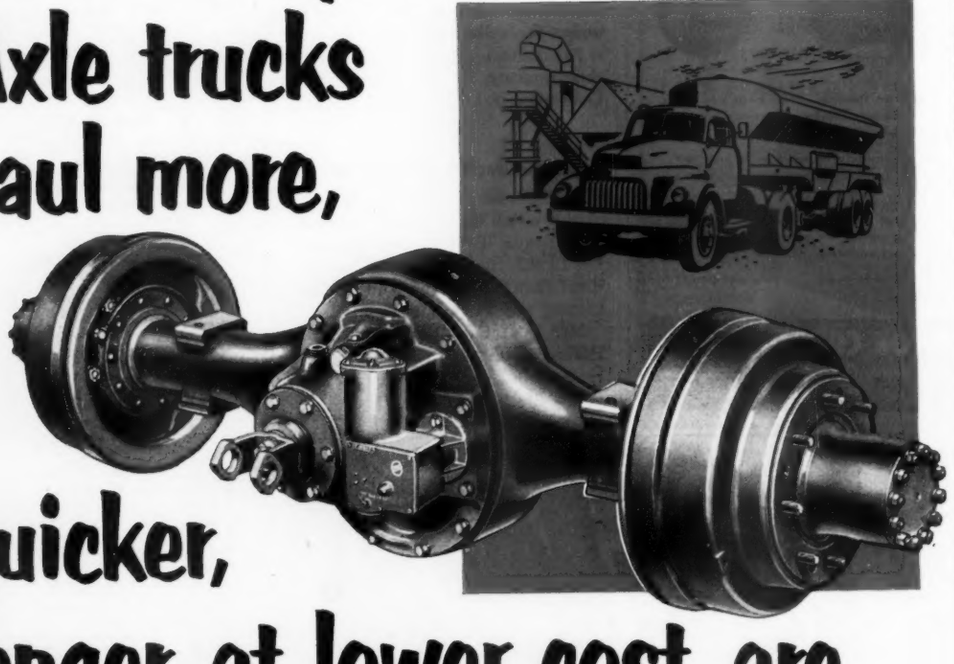
Weed-Control Booklet

■ A booklet that contains helpful information on a wide variety of chemicals recommended for weed, grass, and brush control is available from the Chipman Chemical Co., Inc., Dept. 22, 44 Factory Lane. Bound Brook, N. J. The booklet explains what the chemicals are, what they are used for, and how they are used.

A number of pages is devoted to illustrations and detailed descriptions of the most troublesome weeds, along with specific directions for their control. A considerable amount of information on killing brush, trees and stumps is also included.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 440.

Performance Records* prove Eaton 2-Speed Axle trucks haul more, quicker, longer, at lower cost, are worth more when traded-in



*More than a million-and-a-half Eaton 2-Speeds in trucks today! For complete information, see your truck dealer.

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The improved Kwik-Mix Moto-Bug.

Powered Wheelbarrow Gets Dead-Man Brake

■ A number of new safety and performance features have been incorporated into the power wheelbarrow made by the Kwik-Mix Co., Port Washington, Wis. The Moto-Bug now has an adjustable dead-man internal expanding brake system which instantly stops all machine movement when the operator's foot is off the treadle. In addition, soft-core rubber tires are standard for the fork-lift version of the unit and are optional for use on other Moto-Bug types.

Other features include more efficient transmission of power from the 6-hp gasoline engine to the drive-wheels through the use of a cog-type V-belt of rayon cord. An inspection door has been built into the front panel of the cowl to make the V-belt and other engine parts more accessible. The rear of the engine is open so the power plant can be inspected from both sides.

For further information write to the Kwik-Mix Co., 3029 W. Concordia Ave., Milwaukee 16, Wis., or use the Request Card at page 18. Circle No. 390.

Line of Car Unloaders And Belt Conveyors

■ Portable car unloaders and belt conveyors are illustrated in literature from the Atlas Conveyor Co., Clintonville, Wis. Shown is a heavy-duty car unloader, Model 124, designed for handling heavy abrasive materials such as sand, gravel, crushed stone, steel slag, and soda ash. The unit has a capacity up to 190 tons per hour.

A 24-inch belt conveyor, the Model 125, is 60 feet long and is shown stockpiling gravel. The literature also describes stationary belt conveyors with 18 to 30-inch belts. These are made of standard pre-assembled frame units.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 376.

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Engine belt and electric driven pumps with many new features to give you outstanding performance at low cost. A.G.C. rated. Write for special bulletins.

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Diesel-Powered Truck

■ A heavy-duty 10-ton truck for construction and quarry work is announced by the Dart Truck Co., 2621 Oak St., Kansas City, Mo. The Model 10-S has a box-section frame similar to that used on the company's large ore-hauling trucks. The truck is built on a 100-inch wheelbase for maneuverability in close quarters. It turns in a radius of less than 20 feet. The one-man cab is said to provide good driver visibility.

The new model is powered by a 6-cylinder Continental RD 6572, a 156-hp diesel engine, said by the manufacturer to provide the truck with the highest horsepower rating of any comparable unit in its class. Tires are of the rock-lug type and are interchangeable. The hoist is a twin 6-inch-diameter double-acting single-stage unit which raises to a 60-degree dumping angle and dumps in ten seconds.

The Dart heavy-duty 10-ton Model 10-S truck.

For further information write to the company, or use the Request Card at page 18. Circle No. 368.

New two-yard Caterpillar No. 6 Shovel stays on the go with TIMKEN® bearings

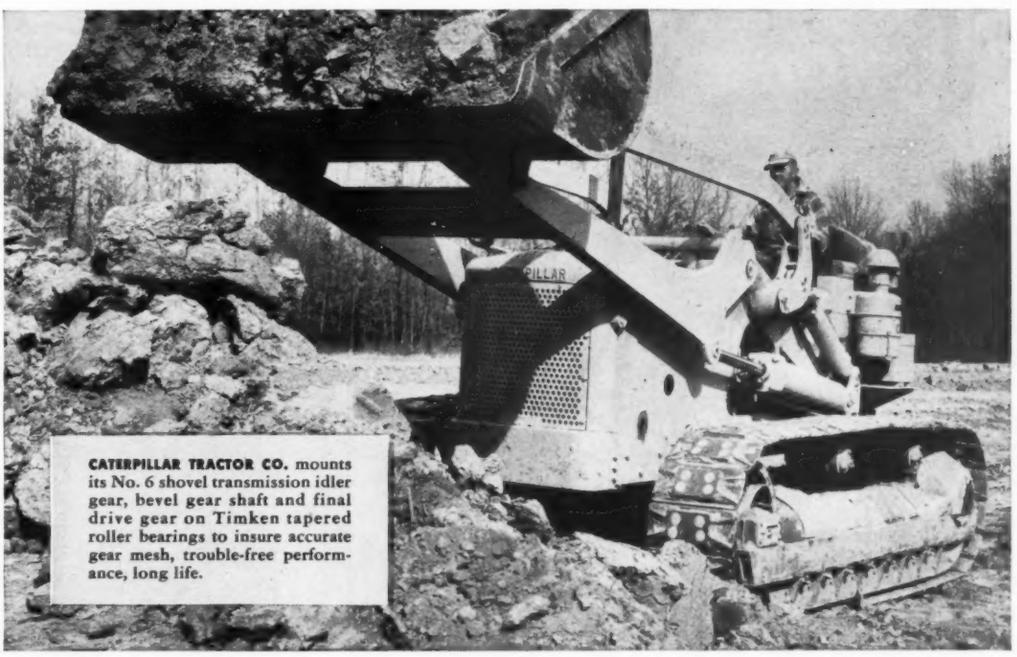
THE new Caterpillar® No. 6 Shovel is designed from the ground up for excellent balance and great stability. To make sure it keeps digging, lifting, carrying and dumping with minimum time-out for maintenance, Timken® tapered roller bearings are used on the transmission idler gear, the bevel gear shaft and on the final drive gear.

The thrust loads from the bevel gears are handled without extra thrust bearings because Timken bearings take both thrust and radial loads in any combination. Shafts are held rigid, gears mesh accurately. Wear is reduced. Gears last longer.

True rolling motion and smooth surface finish practically eliminate friction. And by holding housings and shafts concentric, Timken bearings make closures more effective. Lubricant stays in—dirt and moisture stay out. Maintenance costs are reduced.

Whether you build or buy construction machinery, make sure the bearings are stamped with the trade-mark "Timken". The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



CATERPILLAR TRACTOR CO. mounts its No. 6 shovel transmission idler gear, bevel gear shaft and final drive gear on Timken tapered roller bearings to insure accurate gear mesh, trouble-free performance, long life.

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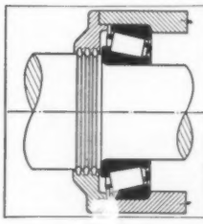

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Because Timken bearings hold shafts concentric with housings, closures are made more effective. Lubricant is retained, dirt and moisture kept out.

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Naylor pipe "eats up" sand, gravel and water wherever a construction job calls for this strict diet. Though light in weight, this distinctive lockseamed, spiralwelded pipe has the extra strength, leaktightness and safety that makes it outstanding for rugged service. It's easy to handle, install and knock-down—especially when used with Naylor Heavy-duty Wedge-Lock couplings. Sizes range from 4" to 30" in diameter. Write for Bulletins No. 507 and No. 513.

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New Bridge Forms Prove Economical

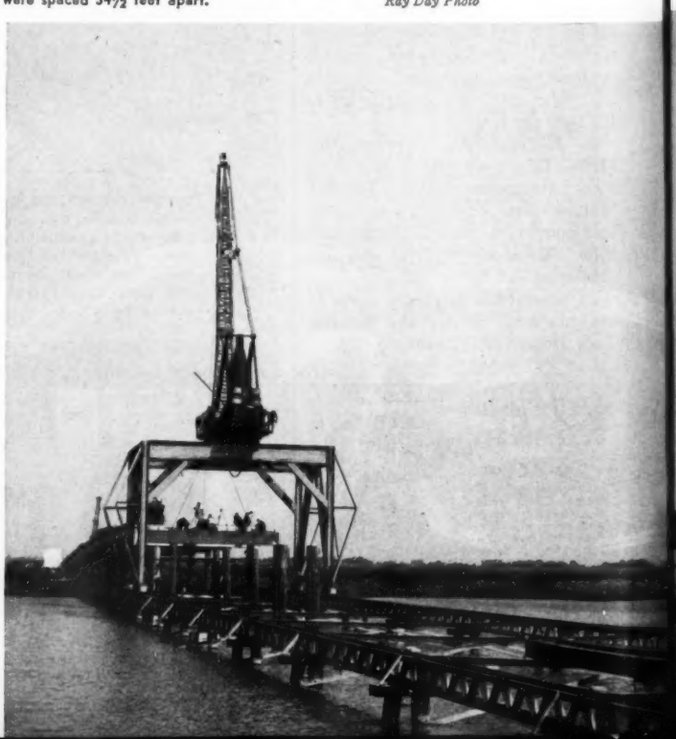
Contractor uses gantry-mounted crane and standardized forms in building three reinforced-concrete bridges

A New Bridge Form Design developed in Texas has enabled a contractor in that state to construct three modern reinforced-concrete bridges with a total length of 1,440 feet for less than a quarter of a million dollars. Included in the project was the demolition of the three old spans which the new structures replaced. The job was started in May, 1952, and completed in June, 1953, at a cost of $240,000.

Harry Newton, Inc., Graham, Texas, was the builder of the bridges, all located approximately 18 miles southeast of Beaumont, Texas. The new design was originally developed by the Texas Highway Department and was first put in use by a Texas county road department. The forms appear to be one of the answers to the standardization of bridge construction with its resulting economies.

The design for the new forms was conceived several years ago by B. A. Trice. At the time, he was a designing engineer for the Texas Highway Bridge Department. At present, he is with the Newton firm as a project engineer. His ideas were not received favorably, for it was

A general view of the Bridgemaster. Rails for the gantry mounting were spaced 34½ feet apart. *Ray Day Photo*



...ines at water level pour one of the pile caps ...d the base of a prefabricated bent which has ...been set. *Ray Day Photo*

felt that the initial investment necessary to purchase a set of forms would cause contractors to boost their prices considerably for such a bridge job.

Some years later, a Burleson County engineer, who had worked with Trice on his new design, suggested to his Board of County Commissioners that the county purchase a set of the new forms and standardize its bridges. He was given authority to proceed, and he began replacing the old wooden bridges that had outlived their usefullness with new concrete spans at a reasonable cost. The modernization project aroused much interest.

The following spring, the Newton organization was asked to present a paper before the annual Texas Highway Short Course, explaining the contractors' point of view regarding bridge construction and its possible standardization. The paper pointed out the success of Burleson County with standardized bridge design and reiterated the Associated General Contractors of America's plea for a nationwide scale of standardization of design so that contractors might build bridges at a lower cost.

Within a few months of the Short Course, the first two projects calling for bridges using the new plans were put up for bids. The results were so favorable that the design was soon established as a standard for short span bridges over shallow water, especially on secondary roads.

The Newton Job

The Newton job, located on Texas farm road Number 365, called for the demolition of three old timber structures and the construction in their place of a trio of reinforced-concrete bridges. One bridge is 90 feet long, one is 570 feet in length, and the longest, over Hillebrandt Bayou, measures 780 feet.

The wooden bridges had 17-foot roadways. The substructure timbers were deteriorated. The new bridges have 26-foot clear roadways, curb to curb. They have 30-foot spans and are built entirely of reinforced concrete. Reinforced-concrete piles, driven to 31.8 tons of bearing, support the spans.

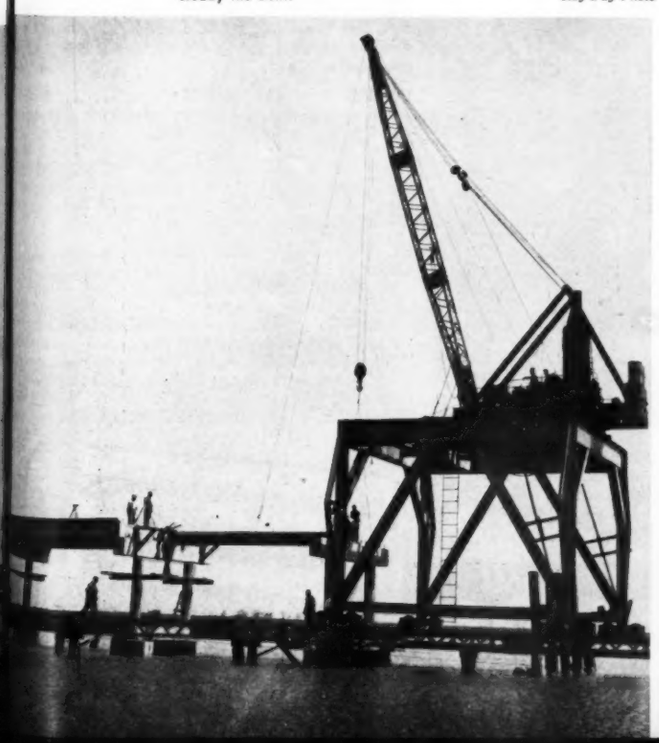
The plans called for the driving of two and three-wood pile clusters alongside the outer edges of the old wooden bridges, capped to carry standard gage railroad track set at 34½-foot centers. A specially outfitted gantry-mounted crane, called a Bridgemaster by the Newton firm, uses the track. The old bridge was removed after the laying of the track. Then, piles were driven and a concrete cap was placed with a prefabricated column best set in place. The deck forms were quickly set and the deck concrete was placed.

The Bridgemaster crane consisted of a heavy steel gantry set to clear the track by a vertical distance of 23 feet. On top of the gantry platform a rig, equipped with a Clyde three-drum hoist, a 40-hp steam boiler, and a 60-foot crane boom, was mounted. A system of gears and drive rods operated the wheels, making the machine self-propelled.

The Bridgemaster's design allowed it to be disassembled by a crawler crane. It laid its own tracks by driving wood piles in clusters of two's and three's, depending on the depth of water and bearing underneath. After being cut off to exact elevation, they were capped. Heavy fir timbers equipped with standard-size railroad rails were then set on top of the caps and leveled. As each bent ahead was completed, capped, and other rail

(*Continued on next page*)

Newton's Bridgemaster, a gantry-mounted crane, sets one of the prefabricated bents into position. The steel form section also helps steady the bent. *Ray Day Photo*



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New Bridge Forms Prove Economical

(Continued from preceding page)

sections set, the machine moved on to do another bent. Meanwhile, while this work was in progress, the Newton organization was busy precasting reinforced-concrete piles up to 62 feet long.

For this work, the company used a form design of its own. The form consisted of a U-shaped steel form, made of ⅛-inch steel skin stiffened at proper intervals by longitudinal 1½-inch angle iron. The forms were built in sections, all typical with the exception of the point, which was tapered.

Pouring

For pouring, the forms were set and cleaned, a steel reinforcing cage was placed, and easily fastened steel clips were set across the top at regular intervals to prevent them from spreading. When the forms were all arranged, truck-mixed concrete was ordered from the Brown-Lane Co., Inc., Port Arthur, Texas. It was placed directly from the truck-mixer spouts.

After the precast piles set for a few days, the clips were removed and the forms were turned over and stripped. A light wood trowel finish and edging along the top of the forms was all the hand work necessary. The chamfered edges of the other two dimensions were formed by the shape of the corners of the special concrete forms.

These piles were picked up and carried to the bridge location by a small Lima Paymaster crawler crane which transferred the various units to the Bridgemaster by means of cable slings. Using a 68-foot set of leads, the crane then moved in and drove the concrete piles to final location with a Vulcan No. 1 steam hammer, operated from its own boiler. As a rule, four piles were driven under each of the two footings in a bent. Vertical piles, as well as those with a batter of 1 on 6, were driven.

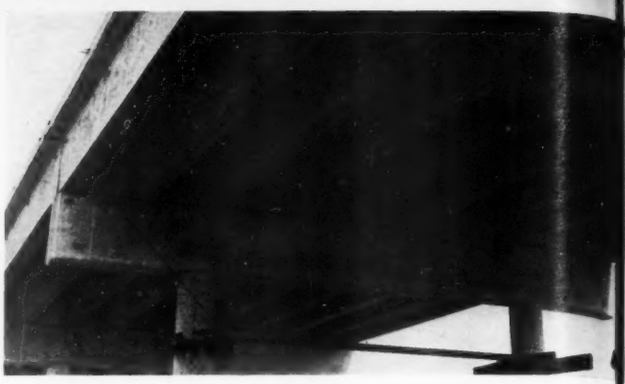
At the same time, a cluster of four wood piles was driven in the center between the concrete piles to support steel I-beams, which would later be used when the prefabricated bents and other parts of the bridge went in. Square steel forms were brought in and set in place over each cluster of concrete piles. These forms contained openings big enough to clear the concrete pile tops by 1 to 2 inches. After the forms were set and checked to final elevation, plywood collars slipped down over the concrete piles and made these steel boxes relatively watertight. A 6-inch concrete layer was then placed in the bottom of each box to seal it off and make it absolutely watertight for the coming major pour.

Bents Prefabricated

Also fabricated ashore were the reinforced-concrete column bents designed to rest on the foundations. The bents consisted of two round columns with square tie beam below and cap above. A combination of wood and steel forms was built, and these units were precast to form a completed bent, leaving dowel steel protruding above and below. The units were prefabbed as close to the bridge location as working space on the approach embankment would permit.

When the Bridgemaster had finished its work with foundation piles, one of these prefabricated column assemblies was delivered by the Lima Paymaster and picked up by the machine. Texas State Highway Department survey parties were present when the prefabbed column assemblies were set. The use of transits and levels insured perfect accuracy.

The prefabricated bent was set on a supporting assembly consisting of two heavy 24-inch open truss beams resting on the four wood piles previously driven in a cluster in the



Blaw-Knox Concrete Spreader and Finishing Machine apply assembly-line efficiency to a superhighway project in the East. Blaw-Knox Spreaders are standard equipment in most high-speed paving operations. They spread modern harsh, dry mixes of 1½" to 3" slump with speed and economy, assuring production of dense, durable concrete slab.

Blaw-Knox Spreader-Vibrator and Finishing Machine ride on Blaw-Knox Steel Forms on a California State Highway project. Note edge of completed slab adjacent to the lane being paved. Freedom from honeycomb is due to the compaction of the concrete with the vibratory attachment on the Spreader.

Blaw-Knox 25-ft. width Spreader-Vibrator and Finishing Machine speed work on a 12" concrete runway for an airport. The double-screed Finisher assures high daily production and a smooth finish regardless of the type of concrete used.

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The underside of the deck. A deck span required only 34.3 cubic yards of concrete.
Ray Day Photo

center of the bent. Timber cribbing and wedges were used to level each bent assembly. The control made possible by the steam power of the Bridgemaster permitted each to be lowered to exact position. When wedges had been inserted at the proper points to hold each prefabbed bent at the right elevation, the top was spread to the right spacing by one of the special deck forms and was tied back to hold a strain the other way with a two-cable bridle and turnbuckles. At this point, the main pours were made on the foundations below to tie the reinforced-concrete piles monolithically with the prefabbed column bents.

Deck Forms

The special steel deck forms, weighing 1,080 pounds each, were then brought in. These consisted basically of ⅛-inch steel-plate shells, stiffened at regular intervals by steel diaphragms and equipped at their lower edges with steel flanges 4⅛ inches wide. The flanges, clipped together with clip fasteners, formed concrete girders with 8-inch faces. The upper end of a form in place consisted of a formed curve with a 1-foot-1⅛-inch radius, so that each girder flared from its 8-inch edge in a fluted sort of arrangement to form a deck slab 3½ inches thick at its thinnest point.

The forms were 28 feet 3 inches long. Each panel was 3 feet wide. Each form end rested on a 3 x 6 timber bolted into the concrete of the upper end of the tie beam. Richmond coil ties were placed in the prefabbed column assemblies at these points for that purpose.

In the center of the Hillebrandt Bayou Bridge, where a few heavier columns and larger beams were, Richmond coil ties were inserted to carry the temporary timber cleats supporting the special deck forms. Bolt tightening was not even necessary for the installation of these forms. Special fasteners passed through matching holes and locked on intervals of 2 feet.

Side forms for the edge of the deck were also of ⅛-inch steel plate, with suitable stiffeners, and were equipped with matching flanges which fit the outer deck form edges. Newton equipped these forms with extensions at the top, making the bottom edge of a narrow pedestrian curb at each side of the bridge. Only 34.3 cubic yards of concrete was necessary to build one of the 30-foot spans with pedestrian walkways.

Deck concrete was also brought in by truck mixers from Brown-Lane. It was dumped directly into a 1-yard Blaw-Knox transfer bucket and was handled to the placing point by the Bridgemaster. A 5-sack concrete mix was used, with enough air-entraining agent to develop about four to five per cent of air content. After being vibrated by a gas-driven internal-type vibrator, so that the concrete would encase the steel evenly, the slabs were finished off by wood floats, straightedges, and a pulled belt finish. The 6-inch black oxide center-line stripe, which is standard equipment on Texas highways, was also placed at the time each slab was poured.

Provisions for expansion and contraction included the placement of mastic material at points across the top of the tie beam at each bent and at every second interval between the deck monoliths themselves.

The guardrail consists of steel I-beam posts, bolted to the concrete of the pedestrian curb. A reinforced-concrete beam crosses the top of each post. These beam sections also were prefabricated on the ground and equipped with bolts and tie plates. They were assembled in the field after the main deck and curb pour was completed.

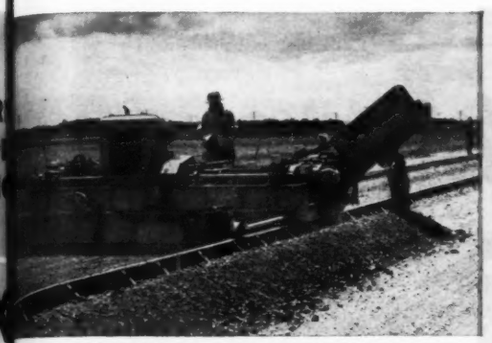
The New Forms

Some of the first of the new forms, which were purchased two years ago, have been used an estimated 75 times. They are still as good as the day they were bought. They can be made by most steel companies. In many cases their details now comprise only two sheets of standard plans in Texas bridge specifications. The design meets every modern AASHO loading standard and gives unbelievable economies in forming. The forms are also easy to strip. A 2-inch round vent hole is formed at the thin part of the slab in the center of each 3-foot bay. When a deck pour has been completed, the forms are secured by chain and hand hoist, the timber cleats are removed, and the form assembly is dismantled on an individual basis. As each form is dropped down away from the deck, it is brought to the outer edge of the bridge where it can be picked up and moved to a new location by the Bridgemaster.

Personnel

Newton's contract was under the general supervision of the Texas State Highway Department, headed

(Concluded on next page)



Blaw-Knox Precision Subgraders, like this one working on Canadian Highway, are the only fine-grading machines which use vibration to make the exacting job of preparing the subgrade absolutely true to crown and cross section possible, fast and less costly.

Blaw-Knox "Package" equipment on an Expressway near Chicago. The Blaw-Knox Spreader with vibratory pan attachment was specified to secure satisfactory placing of the low slump, air-entrained concrete. A Blaw-Knox Finisher, riding on Blaw-Knox Steel Forms, follows the Spreader. Blaw-Knox Aggregate and Cement Batching Plants were used to insure accurate batching.

Blaw-Knox Self-Aligning Steel Paving Forms permit more rapid, lower cost form setting, always true to line and grade. The Steel Forms shown above carry the weight of the Blaw-Knox Spreader and Finisher in addition to the full width of the concrete without distortion or misalignment. Special Heavy-Duty Steel Forms are available for heavier work.

Blaw-Knox Portable Batching Plants are an integral part of the "Complete Package." Available in 2 and 3 compartment styles of 100 tons capacity, and in 4 compartments of 150 tons capacity.

Blaw-Knox Portable Bulk Cement Plant above has 400-bbls. elevated storage and 400-bbls. ground storage. Plant is equipped with a 1½-yd. electrically interlocked cement weighing batcher. Available in sizes and types for every need.

Blaw-Knox Clamshell Buckets are designed to speed production and cut material handling costs. Built in sizes ranging from 1/3-cu. yd. up, in weights to meet all operating conditions.

Blaw-Knox "Complete Package" was used by many of the contractors with Penn Turnpike contracts. Shown above is the Spreader-Vibrator and Finishing Machine. Blaw-Knox Subgraders and Batching Plants were also used for the Penn Turnpike project.

MultiFoote 34-E Concrete Paver is a part of this "Complete Package" on the Penn Turnpike, paving 12′ pavement, 9″ thick, of 6″ base and 3″ top, at a rate of 1500′ per day. Ask your Blaw-Knox—Foote distributor for complete details about MultiFoote Pavers.

Economical Bridge Forms

(*Continued from preceding page*)

by D. C. Greer, state highway engineer. Randle B. Alexander is bridge engineer. The job was done in the jurisdiction of District Engineer W. E. Simmons at Beaumont. R. B. Terry, resident engineer, handled the project under the direct supervision of E. R. Young, supervising urban engineer. C. A. King, general superintendent, headed the field forces of Harry Newton, Inc. THE END

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Offer the dependable, low cost source of electric power that every contractor wants to operate power tools and lighting equipment. Available with bolt-down bases, portable 2 wheel dollys or carrying handles.

These plants are the big value for long life and performance.

Also available — the famous Nite-Hawk trailer mounted, flood light units.

WRITE FOR LITERATURE AND PRICES

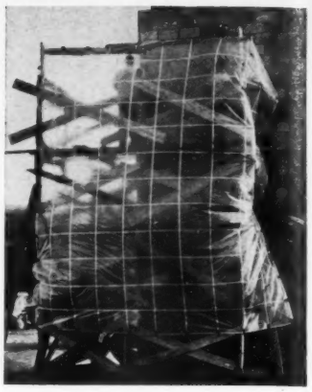
WINPOWER MFG. CO.
TEL. 236 NEWTON, IOWA

500 watt to 20 k.w. — A.C. or D.C.

Plastic Tarpaulin Used as Windbreak

■ New lightweight, transparent, plastic tarpaulins that serve as windbreaks are made by Canton Containers, Inc., Plastics Division, 1101 Ninth St., S. E., Canton 7, Ohio. Because of their light weight, the C-Line polyethylene tarpaulins are readily handled on the ground and can be used on high scaffolding. The manufacturer points out that the windbreaks are strong enough to keep out rain, sleet, snow, and cold, but are also transparent enough to permit light to enter. They remain flexible even in temperatures of 78 degrees below zero.

The tarpaulins are reinforced with Fiberglas every 12 inches, and the reinforced edges are grommetted every 18 inches to facilitate fastening to scaffolding or other supports.



For further information write to the company, or use the Request Card that is bound in at page 18. Circle No. 416.

LITTLEFORD "Spray-Master"

BITUMINOUS DISTRIBUTOR

Gives Low Cost • Mix in Place • Seal Coat Jobs

Here's the Bituminous Spraying unit that will handle Asphalt, Tar, Emulsions, Cut-Back and Road Oils for any road maintenance or construction work. It's engineered to operate with the minimum of cost and designed to eliminate valves, pipe lines and controls, making it simple to operate.

Spray Bars operate up to 24 ft. in width, both the Standard Suck-Back Bar or the Full Circulating Vacuum Flow Bar give 100% efficient spraying action.

Littleford "Spray-Master" Bituminous Distributors are the most modern units on the market today. Made in either truck mounted or semi-trailer models. Sizes range from 800 to 4000 gallons.

"Spray-Master" Distributors are fast heating, safe, efficient, low-cost in operation. See your nearest Littleford Dealer or write.

LITTLEFORD BROS., INC., 485 EAST PEARL STREET, CINCINNATI 2, OHIO,

Land-Clearing Rake For Bulldozer Blade

■ A land-clearing device that attaches to a bulldozer blade and clears up to 11 feet at a single pass is announced by Ferris Brush Grubber, 1297 Muscott St., San Bernardino, Calif. The device removes roots, thus preventing regrowth, and eliminates the need for multiple passes over heavily brushed land. It will clear without removing the topsoil. The rake also piles the grubbed material for burning.

Only two pins are needed to secure the Brush Grubber to a bulldozer blade. Teeth are removable by means of keys. They can be adjusted for rock work or other special conditions. A standard size for most land-clearing work and a special flared type useful for clearing salt cedar, willow, and single-root brush are available.

The rake can be obtained to fit Caterpillar, Allis-Chalmers, International, and other track-laying tractors, as well as graders. Attached to one side of a motor grader moldboard, it has been used on the side slopes of highway cuts.

For further information write to the company, or use the Request Card at page 18. Circle No. 401.

Hydraulic Carry Scrapers

■ Hydraulically operated earth-moving equipment is illustrated in literature from the Be-Ge Mfg. Co., P. O. Box B-1, Gilroy, Calif. A line of fully-hydraulic hauling scrapers shown is the ST series Speedhauls, designed for use with track-type tractors. Controllable cut and spread and forced roll-out ejection are features of the line. Two hydraulic cylinders power the blade, providing positive down-pressure for cutting and power for lifting. Capacities offered are 4½ to 12 cubic yards heaped. The company also makes scrapers for wheel-type tractors with heaped capacities of 4.5 and 6 cubic yards.

Also illustrated is a bucket-type trencher that mounts the Case VAI tractor. The unit digs a trench up to 24 inches wide to a depth of 5 feet. A backfill blade comes as standard equipment.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 384.

BURCH UNI-FLOW SPREADER
for Salt, Sand, Cinders, Chips, etc.

Permits efficient, economical elimination of ice hazards. Operation direct from truck power take-off. Easily adjustable spreading baffles. Fully enclosed spinner reduction gear and multiple plate clutch (cab controlled). Standard sizes 5 and 9 cu. yd. Designed for easy and proper mounting on standard motor truck chassis. Spinner unit can easily be removed and hopper used for hauling miscellaneous materials. Write Dept. CE-123 for literature today.

BURCH is the BEST BUY!

BURCH-BUILT ROSS SNOW PLOW

Sno-Flo design eliminates side draft and offers least resistance in compact snow. Snow is lifted, rolled, and ejected in a continuous flow. Renewable reinforcing plate provides rugged strength where most needed. Tough, high-carbon steel cutting edges fastened directly to reinforcing plate give an extra-rugged assembly. Write for literature today.

The BURCH Corporation
CRESTLINE, OHIO, U.S.A.
MANUFACTURERS OF EQUIPMENT FOR CONSTRUCTION AND MAINTENANCE OF ROADS AND STREETS

Early Consultation Urged For Insurance Protection

If a contractor is not getting his money's worth from his compensation insurance carrier, the fault rests with the contractor himself, according to S. F. Staples, vice president in charge of sales and advertising for Employers Mutuals of Wausau, Wausau, Wis. Mr. Staples, speaking before the National Safety Congress, declared that it is virtually impossible for the insurance man to get a good idea of the risk he is asked to protect because he is often left completely out of the contractor's operations and planning.

In order for the carrier to render the best service, Mr. Staples said, the representative should be consulted when any new development arises in the contractor's insurance program. Knowledge of the contractor's projected activities and changing operations is essential to the carrier, he added, pointing out that only in this way will the carrier be in a position to render full service to the contractor.

The cost of workmen's compensation insurance, Mr. Staples emphasized, can be controlled and should not be considered a fixed expense. Premium payments are based on accident experience; a reduction in accidents means a reduction in payments. Four things a workmen's compensation insurance carrier provides are financial strength; a knowledge of the contractural field; claims, underwriting, and audit services; and accident prevention and job training services.

Regarding these last two points, Mr. Staples said a number of carriers today offer excellent safety programs and services. The insurance company can be of help to contractors by forming and executing programs like the toolbox discussion method for employees. This type of program, which gives workers information on what they are to construct, how it is to be constructed, and safe work conditions, assists the contractor by reducing risks for both himself and his carrier.

Vacuum-Type Conveyor For Bulk Materials

■ A vacuum-type conveyor system that handles cement and other bulk material is shown in literature from Vacu-Blast Co., Inc., P. O. Box 885-R, Belmont, Calif. The Vacu-Veyor conveys up to 40,000 pounds per hour and carries material up to 150 feet vertically and 200 feet horizontally.

The only manual operation involved in the use of the conveyor is the guiding of the pickup nozzle. The nozzle operates up to 350 feet from the unloader unit while vacuum and dust collector units can be located an additional 300 feet from the unloading point if necessary. The dust-collector unit retains all suspended impurities and releases clean, dust-free air into the plant atmosphere. The unloader provides a continuous and rapid means of discharging materials through the cyclone separator. The units are powered with electricity, gasoline, or diesel engines.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 395.

The Insto-Gas Model 1410 floor-type salamander.

Gas-Fired Salamanders

■ Two new gas-fired salamanders are announced by the Insto-Gas Corp., 1977 E. Woodbridge, Detroit 7, Mich. Model No. 1405 attaches directly to the top of an Insto-Gas cylinder. Model 1410, a floor-type salamander, is connected to the cylinder by a hose. Both units are capable of producing 150,000 Btu per hour. While both models are portable, the floor-type, when connected by various lengths of hose, can be used over a wide area without moving the cylinder.

The salamanders light instantly and produce no smoke, soot, grease, or ashes. They give off no monoxide fumes and are, therefore, safe for use inside buildings, according to the manufacturer. Both units have a flat top which is convenient for keeping materials workable and for heating coffee and food.

For further information write to the company, or use the Request Card that is bound in at page 18. Circle No. 361.

Blaw-Knox Buying Apsco

A preliminary agreement for the Blaw-Knox Co.'s acquisition of all outstanding stock of the All Purpose Spreader Co., Elyria, Ohio, has been reached. The acquisition of Apsco will complement Blaw-Knox activities and fill out its product line of road-paving equipment.

Save Costs!

PLACE CONCRETE FASTER...

in any FORM... Get BETTER RESULTS

with HI-LECTRIC CONCRETE VIBRATORS

The Maginniss HI-LECTRIC Vibrator places concrete with a maximum bond for greatest strength. Patented construction with electric motor in head develops up to 10,000 V.P.M. yet is so light in weight that one man, alone, can vibrate 1½" slump and up to 3" aggregate faster than with heavier units. No flexible shafts or power units to lug around. The result is faster placing and reduced labor cost. "The greatest improvement in concrete vibrators in a decade." Write.

Maginniss POWER TOOL CO. Mansfield, Ohio

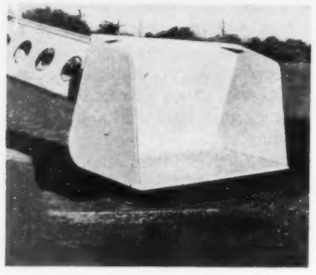
MC BIN BATCHER-MIXERS

An Unbeatable Combination

Whether used for charging an individual 11S or 16S Mixer, or a pair as shown, a Bin-Batcher is the short cut to profit. Enables you to take the advantages of a central plant right onto any job. Several models. Ask for details.

• PORTABLE
• SAVES LABOR
• CUTS COSTS

CONSTRUCTION MACHINERY COMPANIES Waterloo, Ia.



The new snow bucket made for the Gradall telescoping boom.

Snow Bucket Attaches To Excavator Boom

■ A new snow-removal bucket available for the Gradall excavator is reported by the Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, Ohio. Providing another off-season application of the unit, the new bucket is 60 inches wide, 32¼ inches deep, and weighs 585 pounds. It is recommended by the manufacturer for cities and towns.

Attached to the end of the Gradall's 24-foot telescoping boom, the bucket reaches into places inaccessible to conventional snow and ice-removing equipment and can work between parked cars and in tight quarters. It is said to skim snow to the bare pavement and up to the curbing without damaging these surfaces. Straight sides of the bucket facilitate snow disposal. Because the boom rotates 360 degrees, snow can be dispersed anywhere within a 24-foot radius.

For further information write to the company, or use the Request Card at page 18. Circle No. 398.

New Lubricant Performs In Temperature Extremes

A grease said to perform effectively in both desert and arctic operations has been developed by The Texas Co. research laboratories for use in military vehicles. Texaco All Temp grease efficiently lubricates vehicle bearings in ambient temperatures ranging from minus 65 degrees to plus 125 degrees F. The new lubricant contributes to the solution of a difficult logistics problem posed when vehicles are shuttled between regions of vastly differing climates. Formerly, they had required complete relubrication.

The manufacturer claims that the new grease has good low-temperature qualities, excellent shear stability to prevent leakage in tropic heat, and high oxidation resistance. It also offers good rust and corrosion protection for metal parts and performs even when contaminated with water.

For further information write to The Texas Co., Public Relations, 135 E. 42nd St., New York, N. Y.

Bulletin on Bits

■ A new bulletin showing the complete range of Carset Jackbits for use with threaded connections has been issued by Ingersoll-Rand, 11 Broadway, New York 4, N. Y. The bulletin gives the user a selection guide for choosing the right bit for each connection and application.

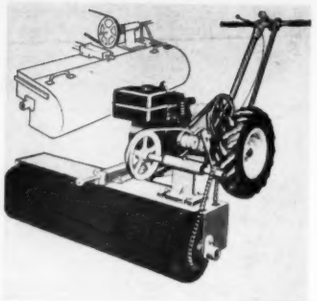
To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 394.

Motorized Sweeper

■ A completely motorized power-sweeper designed to do an effective job on large pavement areas is introduced by The Cheston L. Eshelman Co., 119 Light St., Baltimore 2, Md. The sweeper is said to be suitable for all types of jobs and will even pick up metal shavings.

An all-metal hopper snaps onto the front of the brush and has a 100-pound capacity. It can be unsnapped and emptied by one man. The chain-driven brush is 10 inches in diameter and 36 inches long.

For further information write to



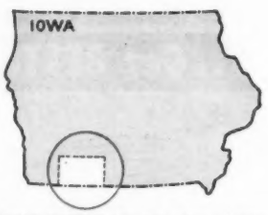
the company or use the Request Card at page 18. Circle No. 347.

Levels Concrete Slabs

■ A concrete-leveling device that consists of two vibrating runners that are pulled across the slab is illustrated in new literature from the Columbus Steel Fabricating Corp., Columbus, Nebr. The Concrete Smoothie is powered by a 2-hp gear-reduction Lawson motor working through an eccentric. Although the machine is shipped with 12-foot metal-edged runners, 4 to 20-foot runners may be substituted.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 388.

Taking Iowa



RINGGOLD COUNTY has 935 miles of county roads. This is the location of farm to market road construction done by the International Crawler fleet of Easter & Schroeder, Inc.

"IDEAL FOR FARM-TO-MARKET ROAD CONSTRUCTION," say Joe Easter and Don Schroeder (above). "In our eight month's working season, our five TD-18A units, with the sixth as a pusher, moved approximately 540,000 cubic yards, with minimum downtime."

Pick Your Site and Set Your Hour...
We'll Demonstrate Our Tractor's Power

ROAD BUILDING PRODUCTION LINE! Part of the Easter & Schroeder fleet of International crawlers on a regrading job in Ringgold County, Iowa. On this seven-mile stretch they moved 78,000 cubic yards in three weeks' time. *"We move it that way all the time,"* say the owners.

Roller Flexibility For Slopes, Ridges

■ A pneumatic-tire roller designed with contour-following flexibility to minimize danger of upsets is recommended for rolling on shoulders, slopes, and ridges. The 10-wheel roller is manufactured by the Tampo Mfg. Co., 1146 W. Laurel St., San Antonio, Texas.

General construction of this roller is the same as that used by the company on its other pneumatic-tire models. Features include a full-swiveling king pin, cast steel rear-wheel oscillating yokes, and heavy-duty bearing seals and dust guards.

The chief feature of the Model P-10A Tampo pneumatic-tire roller is its ability to work on extremely rough ground. The unit's ten tires are divided by an open center gap.

Over-all rolling path of the Model P-10A is 84 inches with an open center gap of 20 inches. The effective rolling width is 64 inches. The unit runs on four front and six rear 7.50 x 15 tires.

For further information write to the company, or use the Request Card at page 18. Circle No. 407.

A Conveyor Belt To Carry Passengers

Commuters who use the connecting tunnel between the Erie Station and the Hudson and Manhattan tubes at Jersey City, N. J., will soon be able to get where they are going by standing still. A contract to build the world's first passenger conveyor belt system, at the New Jersey terminal, has been awarded to the Goodyear Tire & Rubber Co., Akron, Ohio, and the Stephens-Adamson Mfg. Co., Aurora, Ill., by the Hudson & Manhattan Railroad Co.

The proposed passenger belt system, called a Speedwalk, will be installed in the ramp portion of the connecting tunnel. It will move at approximately 1½ mph. Two handrails will travel at the same speed. Operated by push-button controls, the 227-foot moving sidewalk will be reversible in direction, to handle rush hour crowds to and from the tubes.

The new transit method, developed by Goodyear and Stephens-Adamson, can be compared to a flattened-out moving stairway. Entry and exit are accomplished in the same manner as boarding or leaving an escalator. The system will negotiate a 10 per cent grade on the ramp.

Although many designs for Speedwalk systems and passenger conveyor-belt systems employing cars are being made by engineers of the two firms, this will be the first commercial application of Speedwalks.

Tires, Tubes, and Rims For Construction Use

■ Tires, tubes, and rims for construction machinery are listed in a catalog from the Harmo Tire & Rubber Corp., 804 Hammond Bldg., Detroit 26, Mich. The line includes tires that will fit scrapers, graders, tractors, carryalls, trailers, and wheelbarrows. The tires are offered in a variety of sizes and treads, including snow treads.

Assemblies that consist of tires, tubes, wheels, and axles are made for special uses. An order sheet enclosed in the booklet simplifies ordering for particular requirements.

To obtain this literature write to the company, or use the Request Card that is bound in at page 18. Circle No. 420.

Baker Plans New Plant

Plans for the construction of a 40,000-square-foot plant in Beardstown, Ill., for the manufacture of its line of bulldozers, gradebuilders, and root rippers, has been announced by The Baker Mfg. Co., 2573 S. 10th St. at Stanford, Springfield, Ill. The project is part of the firm's $2,000,000 expansion program.

The Beardstown plant, under the supervision of George D. Phares, will cost approximately $600,000.

a to Town

Farm-to-market roads get big boost fast from the International Crawler fleet of Easter & Schroeder, Inc.

The dirt flies when Easter & Schroeder, Inc., move in with their fast, powerful fleet of International crawlers . . . and Iowans can get to town and back in time to do the milking. For these Griswold, Iowa, contractors specialize in farm-to-market roads in the tall corn state.

Take the seven-mile job in Ringgold County, Iowa, you see here. In three weeks' time, Easter and Schroeder moved 78,000 cubic yards of dirt to give the road a 24-foot top on a 66-foot right of way.

Easter and Schroeder came to this Ringgold County job from one in Taylor County, where they moved 35,000 cubic yards of dirt on a two-mile stretch, completing the job in six 11-hour days.

"After 25-years' experience working in dirt, we settled on a crawler fleet one hundred per cent International," say these contractor partners. The fleet now consists of six International TD-18As with scrapers and 'dozers and a TD-14A with tamping roller.

Do you want speed and dependable economy under tough conditions? Then get in touch with your International Industrial Distributor, for all the facts on Power that Pays!

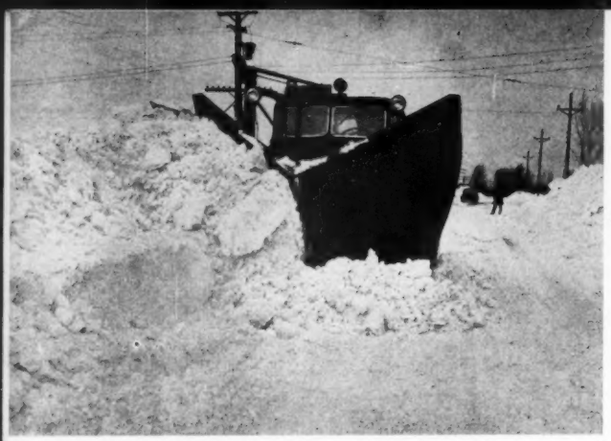
INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILL.

POWER THAT PAYS

INTERNATIONAL

INTERNATIONAL HARVESTER

TD-6 T-6 SEVEN GREAT INTERNATIONAL CRAWLERS...EACH WITH MATCHED EQUIPMENT FOR EVERY JOB



A V-plow goes to work clearing a Pennsylvania highway. There are 2,572 blade and V-type plows in use by Pennsylvania highway maintenance crews in winter.

Assault on Winter Begins in Summer

LONG BEFORE FROST settled on the pumpkin and corn was in the shock, maintenance forces of the Pennsylvania State Highway Department had completed plans and prepared equipment for the annual assault on snow and ice. While their friends and neighbors mopped their brows during the late-summer heat wave, these men were stockpiling cinders for use when the mercury started showing favoritism toward the lower end of the thermometer.

Due to the heavy industrial conversion to diesel and other oil-burning equipment, cinders have been becoming increasingly scarce. Whenever the highway department is able to secure a supply of this prime abrasive, it is immediately stockpiled near points of expected use.

Motorists probably observed these growing stacks during their summer evacuations from the boiling cities. An effort is made to build up a supply of up to 600,000 tons, which experience has shown to be Pennsylvania's average winter requirement. In years of repeated ice storms, the consumption of cinder has been greater, and often other materials, including fine-crushed aggregate, is used as a supplement.

Since these abrasives have soared in price over the years, maximum economy in their use is insisted upon by N. A. Staples, chief maintenance engineer of the department.

Program Cost

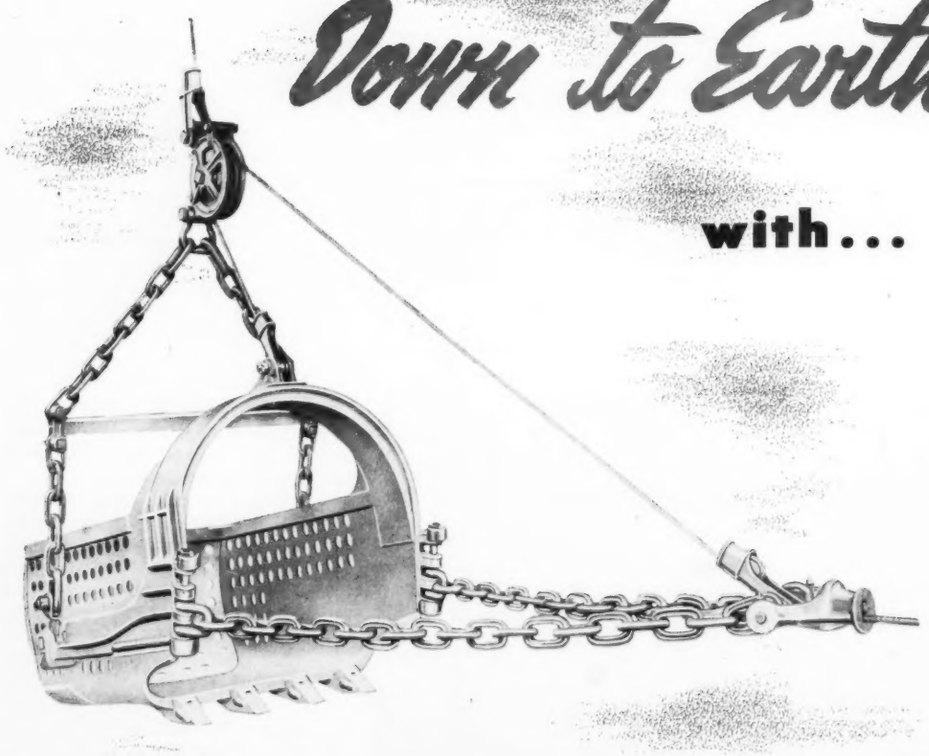
"Snow removal last winter, which was mild in comparison with other years, cost the highway department in excess of $7,000,000," he said. "With demands for highways far exceeding our financial ability to supply improvements, greatest possible value must be derived from the snow removal dollar.

"It must be remembered," he pointed out, "that the $7,000,000 spent for snow removal is money that cannot be spent for long-lived

bring "cost-per-yard"

Down to Earth

with...



HENDRIX DRAGLINE BUCKETS

3/8 to 40 Cubic Yards

A TYPE AND SIZE FOR EVERY DIGGING PURPOSE

Hendrix Lightweight Dragline Buckets

Hendrix Buckets available without perforations on special order.

HENDRIX MANUFACTURING CO., Inc.

MANSFIELD, LOUISIANA

Servicised

ASPHALT JOINT FILLER

- Forms easily compressible cushion
- Highly waterproof
- Low in cost

Made in 5 thicknesses – ¼", ⅜", ½", ¾" and 1" – in any length or width to meet job specifications. Formed between two sheets of heavy asphalt saturated felt paper, which increases strength and rigidity and improves handling.

Write for the complete Servicised Catalog. Describes the full line of Asphalt, Cork, and Rubber Composition Products.

SERVICISED PRODUCTS CORP.
6051 W. 65th ST. • CHICAGO, ILL.

Highway maintenance crews in Pennsylvania need no calendar to know when to prepare for snow and ice

improvements that otherwise could be made on our highways."

In advance of winter, 14,725,450 feet of snow fence was erected, brightly painted guide stakes were set in place along the highways to mark the location of drainage outlets, plows were prepared for quick attachment to trucks, trucks were reconditioned, and all other preparations were made to insure uninterrupted and safe travel.

More than 10,000 men, 7,179 units of snow and ice-fighting equipment, coordinated in the assault on snow by short wave radio, are scattered through the 67 counties of the state. About 350 combination receivers and transmitters are in use. The central station is on top of Dauphin Mountain, north of Harrisburg, and there is a land station in each county. The mobile two-way receivers and transmitters, capable of reaching into every part of Pennsylvania by means of relays, are stationed at the county maintenance headquarters of the highway department.

Over this network, snow removal equipment can be quickly shifted to points of greatest need, previously leased equipment and hired emergency manpower thrown into action, emergency routings quickly arranged around blocked roads, and other necessary action taken to meet rapidly changing situations.

Highway department forces in each county are able to quickly dispatch their men and equipment to critical areas. They can call each other for aid. Or they can call for help from neighboring counties, or from the district headquarters, or even from the central headquarters in Harrisburg.

To insure accurate and rapid transmission of messages, standard operating procedures, codes, and a phonetic alphabet are used. Each operator is licensed by the Federal Communications Commission.

(Concluded on next page)

A cloud of snow is raised by a Snogo rotary plow. There are 27 of these rotary plows in northwestern Pennsylvania, which normally gets the greatest amount of snowfall.

Balanced Design...

ONE REASON WHY BUCYRUS ERIE BLADES CUT ROADBUILDING COSTS

WHAT BALANCED DESIGN IS ... Bucyrus-Erie bulldozers and Bullgraders are mounted on International TD-14A and TD-18A tractors so that the vital balance point of the tractor remains virtually unchanged.

WHAT IT DOES . . . It means that the tractor retains all of its original tractive effort and maneuverability. It puts maximum driving force where it belongs — at the blade. Because there is always a full length of track on the ground, you take full advantage of tractor power and get fine, accurate control over the blade. Finally, there is less wear and tear on the tractor.

HOW IT CUTS ROADBUILDING COSTS . . . Better blade control and tractor maneuverability enables operator to produce accurate grading and fine finishing in a minimum of passes — *you save time.* Having the advantage of full tractor power lets you move more dirt on every pass and get the job done faster — *you save money.* Since there is no waste of tractor power, *you save fuel costs.* And lastly, because there's no upset of balance to strain the tractor there's less wear on tractor parts — *you save maintenance costs.*

Investigate these and the many other features offered in Bucyrus-Erie blade attachments. Get the complete story from your International Industrial Tractor Distributor today. 7153

BUCYRUS-ERIE COMPANY, South Milwaukee, Wisconsin

SEE YOUR INTERNATIONAL INDUSTRIAL TRACTOR DISTRIBUTOR

NEWCO* WIRE ROPE CLAMP & THIMBLE

*trade mark

. . . gives holding efficiency of 95 to 100%.
. . . will not collapse.
. . . no shearing of bolts.

BEARING SERVICE is many times heavier; for example, the ¾" Newco has a ½" bearing surface! Carries a heavier load, and the original cost is easily absorbed by savings on labor and longer life. In 12 sizes.

⅜" to 1" size **STEEL CLAMPS** (Approx. 80,000 PSI's)
⅛" to 5/16" **MANGANESE BRONZE** (Approx. 110,000 PSI's)

See your distributor or write direct to

NEWMAN MFG. & SALES CO.
Dept. CE-12, Box 5939, Kansas City 11, Mo.

Assault on Winter Begins in Summer

(*Continued from preceding page*)

Through the years that have passed since the establishment of this equipment, the operators have become most proficient in its use.

Experience has shown the area north and west of the mountain ranges that cross Pennsylvania to be a more frequent recipient of snow and ice storms than the flat area to the south and east. But this is not a fixed rule. Occasionally, heavy snows sweep northeastward from West Virginia and the South.

It is to meet rapidly changing conditions in every part of the state that the maintenance forces prepared their plans. Though winter's snow and ice may never be accurately predicted, the radio-telephone system does enable men and equipment to be shifted quickly as the situation demands. The snow schedule calls for initial clearance of 20,000 miles of heavily-traveled main highways. After these roads have been cleared, equipment is moved to the less-traveled roads.

Equipment

In addition to 4,416 vehicles of various types owned by the highway department, another 2,763 machines are leased. Additional manpower is hired as occasion demands for the struggle against winter. A full-fledged statewide snowfall will bring into action 10,000 men, 2,426 trucks, 2,572 blade and V-type plows, 27 rotary plows, 10 blower-type plows, 309 plows of other types, 108 tractors, 1,505 "wagonettes"—the highway department's term for ½-ton trucks—393 graders, 42 bulldozers, and 91 miscellaneous units. All this is ready for action day or night, Sundays and holidays, throughout the snow season.

Half-ton trucks and their crews are usually the first on the job. As a snow or ice storm begins, they move to the stockpiles for the job of coating curves and grades with cinders. They work as needed—long hours, seven days a week—until the emergency has passed.

This winter, snow-fighting crews will drop flares in an effort to reduce the number of accidents occurring when motorists crash into snow and cinder equipment, killing and maiming themselves as well as the snow fighters. The flares burn for about 20 minutes. When motorists pass them, they will know snow-fighting equipment is immediately ahead and will have ample time to reduce speed.

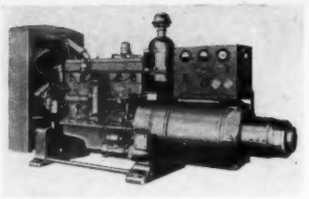
Snow plows continue to use flashing lights. These safeguards are expected to reduce the accident rate during snow and ice storms, when visibility is poor.

Snow removal is costly today. Back in 1923, it took only $91,000 to clear 1,400 miles of roadway. That is somewhere around 20 per cent of the present cost. But the automobile and truck have become so important to our economic life that highways must be kept open at all times and under all circumstances. That is the job of a highway department's maintenance force—and that is the job Pennsylvania Department of Highways crews are doing. THE END

Gas-Powered Generator

■ A new 50-kw 62.5-kva electric plant has been added to the line of gasoline-powered electric generating sets made by D. W. Onan & Sons, Inc., University Ave., S. E., Minneapolis, Minn. The new plant is powered by an International Harvester gasoline engine rated at 104 hp at 1,800 rpm with a 450-cubic-inch piston displacement. The motor is equipped with replaceable cylinder liners, roto exhaust valves, oil bath air-cleaner, and a remote 12-volt starting system.

The generator is of drip-proof design and is direct-connected to the engine for permanent self-alignment. The control box is equipped with a charge-rate ammeter, electric water-temperature gage, electric oil-pressure gage, start-stop buttons, and a running time meter.



The new Model 50KA electric plant, made by D. W. Onan & Sons, Inc.

An automatic voltage regulator is installed inside the control box.

For further information write to the company, or use the Request Card at page 18. Circle No. 402.

Data on Surveying Device

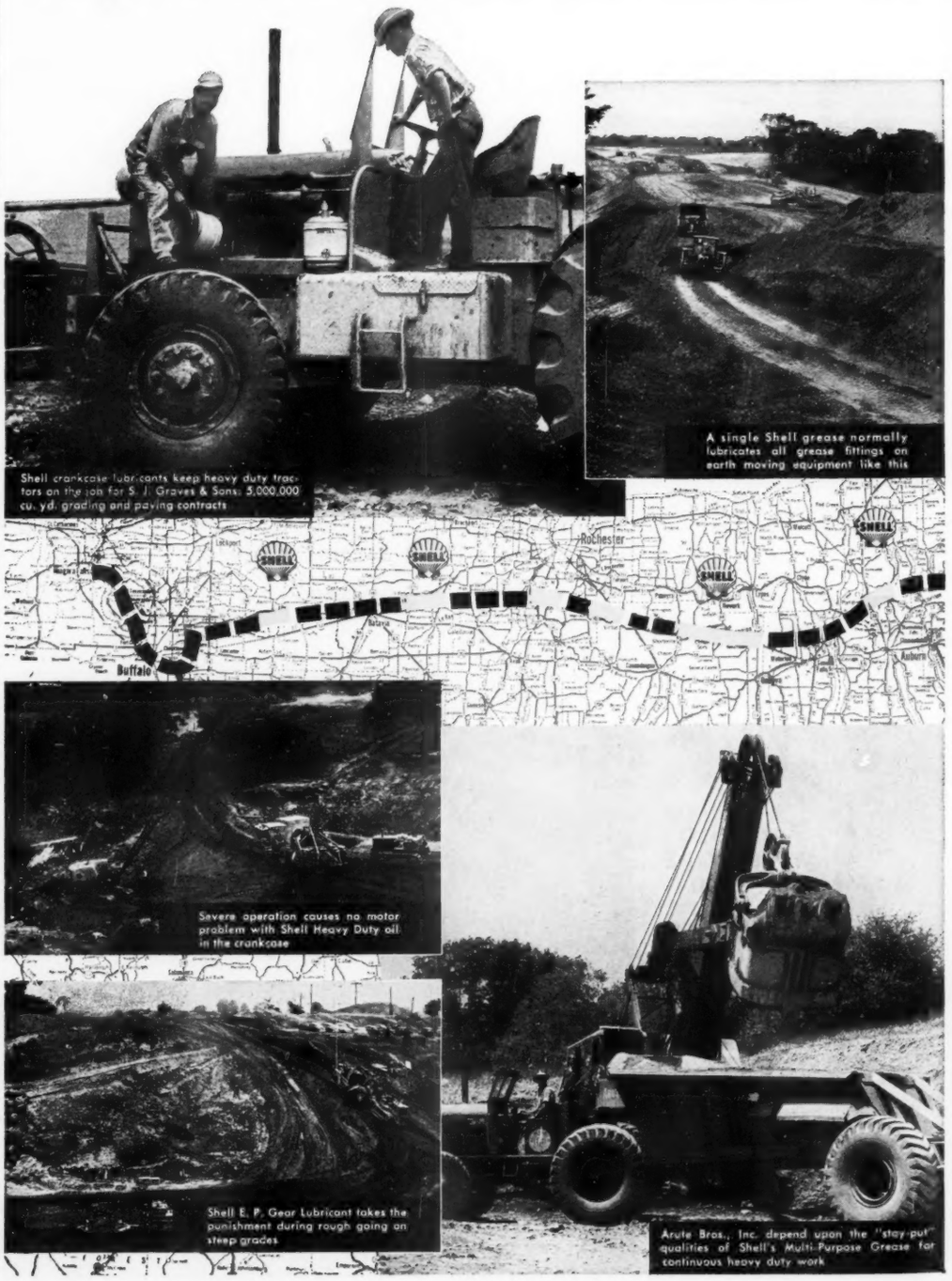
■ The application of the Kern Invar subtense bar to land surveying, photogrammetric control, and cadastral and topographic surveying is discussed in literature from the Kern Surveying Instrument Division, Paul Reinhart Co., Inc., 66 Beaver St., New York 4, N. Y. The instrument consists of a 2-meter-long tube with a target on each end.

The tube is supported by a stand which has a center mark, a tubular sighting device, and a base plate mounted to it. Relatively long distances may be measured accurately to satisfy standard precision specifications.

The booklet gives a brief description of the instrument and goes into some detail on the accuracy of distance measurements. A section is devoted to practical considerations and the adjustment and care of the device.

To obtain this literature write to the company, or use the Request Card that is bound in at page 18. Circle No. 421.

On the New York State Thruway


Shell crankcase lubricants keep heavy duty tractors on the job for S. J. Graves & Sons, 5,000,000 cu. yd. grading and paving contracts
A single Shell grease normally lubricates all grease fittings on earth moving equipment like this
SHELL
Rochester
Buffalo
Severe operation causes no motor problem with Shell Heavy Duty oil in the crankcase
Shell E. P. Gear Lubricant takes the punishment during rough going on steep grades
Arute Bros., Inc. depend upon the "stay-put" qualities of Shell's Multi-Purpose Grease for continuous heavy duty work

Improved Excavator

■ Improvements in its truck-mounted excavator are announced by the Badger Machine Co., 1122 W. 5th St., Winona, Minn. The Hopto digger is completely hydraulic in operation and works without cables, sheaves, chains, and sprockets.

The new Model 120TM-53 may be powered by water or air-cooled engines or driven by the power take-off of the truck. The unit has a digging depth of 11 feet and is available with a choice of bucket and backhoe widths from 8 to 38 inches.

The main frame of the machine is of formed plate which partially shields the operator and permits enclosure for adverse weather operations. Double-acting hydraulic cylinders actuate the gear of the rack-and-gear mechanism which replaces the cables formerly used for swing. Relief valves cushion stops and starts on the 200-degree arc of the boom swing.

The improved Model 120TM-53 Hopto truck-mounted excavator.

For further information write to the company, or use the Request Card at page 18. Circle No. 351.

X-Ray Steel Beams With Atomic Energy

A University of Illinois chemistry professor has demonstrated a way of X-raying welded steel beams without the use of heavy bulky equipment. The new process involves the use of a tiny radioactive isotope, some X-ray film, and a Geiger counter to protect the X-ray technicians.

Prof. George L. Clark has been trying to demonstrate that Cobalt 60 offers a simple means of X-raying steel. When the university wanted to determine the safety of a 60-foot-square underground room that will will accommodate 260 persons, Prof. Clark contacted X-Ray, Inc., 13931 Oakland, Detroit 3, Mich.

The firm sent a crew of technicians to the university along with less than one gram of the atomic substance, which is made by bombarding a piece of dead metal with electrons and protrons which change atoms into unstable form and give off gamma rays. The Cobalt 60 was clamped to the top of a 1½-inch steel beam and the X-ray film was stuck on the underside with adhesive tape.

The developed film showed a large cavity in one of the welded joints of the beam which eventually would bear the main stress of the building. This weak weld could have led to possible collapse of the entire structure.

Electric-Powered Pumps

■ Self-priming electric-powered centrifugal pumps are illustrated in literature from the Rice Pump & Machine Co., 400 Park Ave., Belgium, Wis. The self-priming feature eliminates the need for submerging the pump or providing a flooded suction, the literature points out. The impeller shaft is mounted in large prelubricated and shielded ball bearings.

Belt-drive and flexible-coupled pumps are shown. Sizes of pump openings range from 1½ to 4 inches in diameter. Capacities range from 69 gallons per minute at a 15-foot head to 350 gallons per minute at a 110-foot head for the V-belt pumps. The flexible-coupled units are rated at 55 gallons per minute at a 15-foot head to 322 gallons per minute at a 110-foot head.

To obtain this literature write to the company, or use the Request Card that is bound in at page 18. Circle No. 439.

Dravo Appoints Raines

Garland C. Raines has been appointed manager of publications for the Dravo Corp., Neville Island, Pittsburgh 25, Pa., manufacturer of land and marine construction equipment and materials. Mr. Raines will be in charge of monthly and quarterly company publications.

Mr. Raines, formerly publicity supervisor for the small motor division of the Westinghouse Electric Corp. at Lima, Ohio, is a journalism graduate of Ohio State University.

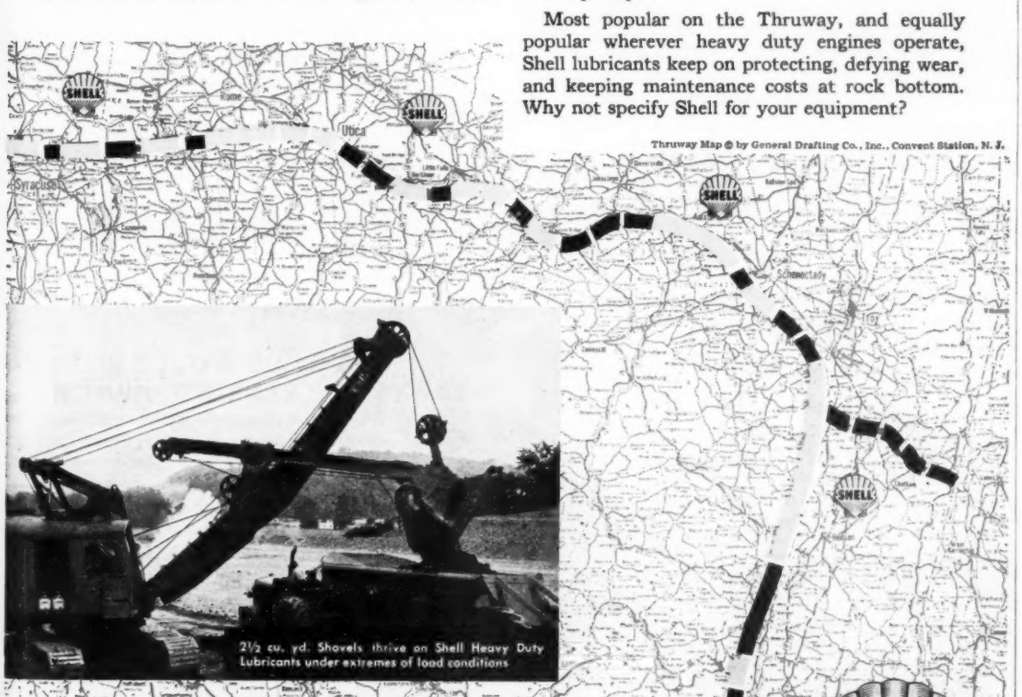
... 1 out of every 3 construction miles uses SHELL PRODUCTS *exclusively*

That's just one way of saying that Shell has been awarded contracts by companies responsible for building sections of the New York State Thruway totaling over one third of the entire mileage. And the contracts are still coming in!

Trucks, shovels, dozers, graders . . . all equipment run by gasoline or diesel engines on those long stretches of highway construction . . . benefit from the outstanding performance of Shell heavy duty lubricants.

Products that can win the unqualified preference of such responsible and efficient operators must have what it takes . . . and Shell products *have* it . . . plenty!

Most popular on the Thruway, and equally popular wherever heavy duty engines operate, Shell lubricants keep on protecting, defying wear, and keeping maintenance costs at rock bottom. Why not specify Shell for your equipment?



Thruway Map © by General Drafting Co., Inc., Convent Station, N. J.

2½ cu. yd. Shovels thrive on Shell Heavy Duty Lubricants under extremes of load conditions

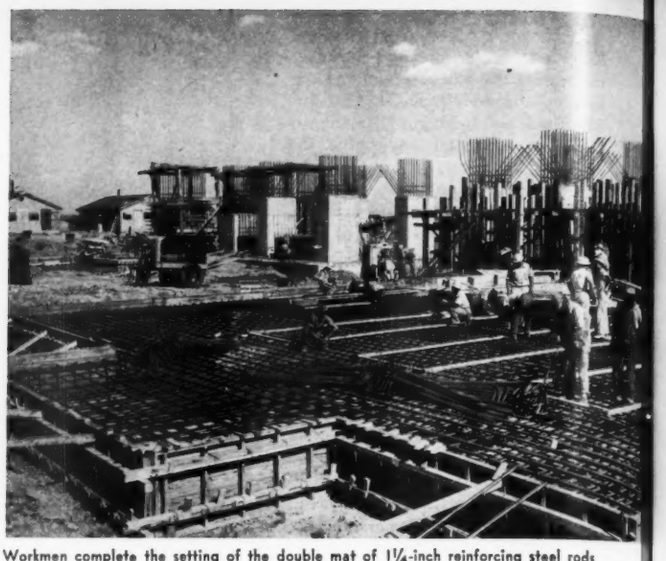
SHELL OIL COMPANY

50 WEST 50TH STREET, NEW YORK 20, N. Y.
100 BUSH STREET, SAN FRANCISCO 6, CALIF.

SHELL

Reinforcing steel is loaded onto a pole trailer by a P&H crane with a 55-foot boom. *C. & E. Photo*

New Steam-Electric Station for Dixie



Workmen complete the setting of the double mat of 1¼-inch reinforcing steel rods for the 2½-foot foundation slab pour for auxiliary bay 1. In the background are the finished piers of unit 2. *C. & E. Photo*

Mississippi Power & Light Co. builds 200,000-kw power plant; earth dikes form pond for storing condenser-cooling water

THE FIRST OF TWO UNITS of its new Delta steam-electric generating station has been put into operation this fall by the Mississippi Power & Light Co. at Cleveland, Miss. The second unit of the 200,000-kw power plant is scheduled for early completion. Each unit is rated at 100,000 kw. Work on the $23,000,000 project got under way late in 1951. The plant was designed and is being constructed by Ebasco Services, Inc., New York City.

The plant is located in Bolivar County in the Mississippi delta country, 3 miles north of Cleveland and about 800 feet east of U. S. 61. Approximately ½ mile west of the highway are the mainline tracks of the Illinois Central Railroad, which services the station with a spur line. East of the 800-acre site is the Sunflower River which supplies cooling water for the condensers at the plant. The water is stored in a one-mile-square pond formed by earth dikes.

Buildings for turbine generator units 1 and 2 cover plots of ground 87 x 38 feet in area. Immediately north are auxiliary bays 1 and 2, covering 83½ x 58½ feet of ground. In these bays are the boiler feed pumps, feed-water heaters, and condensate pumps. Further north, and in line with unit 2 and auxiliary bay 2, are boilers 1 and 2, each occupying an area 79 x 69 feet. Foundations for these structures consist of reinforced-concrete mats supported on 1,600 creosoted timber piles, 30 to 45 feet long. The rest of the construction is chiefly concrete and steel.

Foster Wheeler boilers supplying steam for the plant will normally be

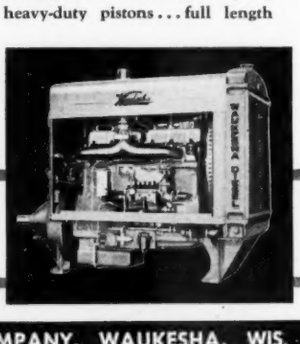
WAUKESHA

145 Series and 148 Series

POWER UNITS

145-GKU	779 cu. in.	Medium Speed, Gasoline (Standard Crankshaft)	167 max. hp
145-GKBU	779 cu. in.	High Speed, Gasoline (Counterbalanced Shaft)	178 max. hp
145-GZBU	817 cu. in.	High Speed, Gasoline (Counterbalanced Shaft)	185 max. hp
148-DKU	779 cu. in.	Normal Diesel (Standard Crankshaft)	165 max. hp
148-DKBU	779 cu. in.	Normal Diesel (Counterbalanced Shaft)	181 max. hp
148-DKBSU	779 cu. in.	Turbocharged Diesel (Counterbalanced Shaft)	250 max. hp

• Heavy duty! That's what the 145 and 148 Series power units are for . . . and what they do. Here's what they have—every detail built for rough and tumble service . . . crankcase-cylinder block is a deep, thick-wall casting . . . massive, drop-forged, 7-bearing hardened crankshaft . . . pressured oil to every internal bearing, gear and shaft . . . dual spring overhead valves . . . cam ground, heavy-duty pistons . . . full length water jacket, with removable liners . . . and other modern features—for clean burning, high economy, lively performance and long life. Send for Bulletins.



148-DKU DIESEL UNIT
6-cylinder, 5¼-inch x 6-inch, 779 cubic inches, 165 hp @ 1600 rpm with standard crankshaft.

224

WAUKESHA MOTOR COMPANY, WAUKESHA, WIS.
NEW YORK • TULSA • LOS ANGELES

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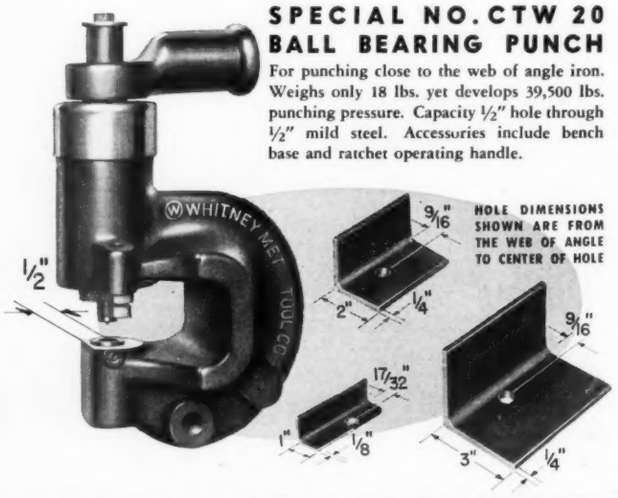
FOR 43 YEARS



SPECIAL NO. CTW 20 BALL BEARING PUNCH

For punching close to the web of angle iron. Weighs only 18 lbs. yet develops 39,500 lbs. punching pressure. Capacity ½" hole through ½" mild steel. Accessories include bench base and ratchet operating handle.

WHITNEY METAL TOOL COMPANY • 720 FORBES ST., ROCKFORD, ILL.

A Euclid loader, pulled by an Allis-Chalmers HD-19 tractor, drops fill into a bottom-dump Euclid. This cut, located inside the pond area, was limited to a maximum depth of 3 feet. *C. & E. Photo*

fired by gas, though reserves of No. 6 bunker C fuel oil are being stored as a standby fuel. An area for coal storage has also been set aside, since the boilers are designed so that they can later be converted to coal. Peak capacity, to be maintained no longer than eight hours, is 950,000 pounds per hour of steam at 1,550 psi at 1,005 degrees F. For continuous service, the plant has a capacity of 900,000 pounds per hour of steam; minimum to be developed is 600,000 pounds per hour. General Electric turbines have a maximum capacity of 99,000 kw, while the generators have a 112,500-kva output rating at 0.5 psig hydrogen pressure.

One of the first steps in construction was the grading of the site. This required some 90,000 cubic yards of excavation. Most of this was borrow brought from nearby pits to raise the station area slightly above the flat alluvial river plain of the delta country. Elevation of the original ground averaged 138.0.

Timber foundation piles were driven through layers of topsoil and river silt to bearing in an underlying stratum of firmly packed sand. The pile spacing varies from 4 feet under the boilers to 6 feet 9 inches under the auxiliary bays.

The reinforced-concrete mats capping the piles are solidly constructed to take the heavy weight above. The mats are 2½ feet thick in the auxiliary bays. In the turbo-generator areas they are 3½ feet thick, while the boiler-room mats are 4 feet thick. Rising from the mats in each of the turbo-generator areas are ten massive reinforced-concrete piers upon which is a concrete slab 80 x 36 x 6½ feet for support of the turbo-generators. Interior piers are 7 feet 4½ inches x 6 feet x 9 feet 2 inches. Outside piers are 7 feet 4½ inches x 4 feet x 12 feet 5 inches.

Concrete and Steel

Forms to take the concrete pours were built of ¾-inch plywood backed with 2 x 6 wales on 18-inch centers secured with Meadow snap ties. Sheffield Steel Corp., Kansas City, Mo., supplied the reinforcing steel. Concrete Products Co., Cleveland, Miss., a transit-mix supplier, delivered 3,000-psi concrete to the job in a fleet of eight truck mixers. The haul distance was 4 miles. An average of 45 cubic yards per hour was maintained during the larger pours. Wells at the site provided water for curing the concrete. A total of 13,000 yards of concrete was used for the construction. Crawler cranes handled the reinforcing steel up to 1¼-inch-diameter rods for the double layer in the mats. They were also used to lift buckets of concrete for the higher pours.

For the boilers, 900 tons of structural and 190 tons of platform steel were needed. The structural steel came from the Bethlehem Steel Co., Leetsdale, Pa., while the Kansas City Structural Steel Co., Kansas City, Kans., supplied the platform steel. The top of the boiler-supporting steel is 120 feet above the ground floor. Each unit has two stub stacks 75 feet high with the top of stack located 10 feet above the top of structural steel. Heavy steel erection was accomplished with a guy derrick.

Water for fire protection at the plant is stored in a 100,000-gallon elevated tank, erected by the Chicago Bridge & Iron Co., Chicago, Ill. It rises 125 feet above the ground.

Man-Made Pond

To provide the 140,000 gpm of water for cooling the condensers, a one-mile-square pond was constructed between the power plant and the river. Within its earth dike walls there are 6,000 acre-feet of storage space. The east side of the dike is 2,500 feet back from an intake structure on the bank of the Sunflower River, which fills the pond through an 18-inch-diameter steel pipe. Water from the condensers is recirculated through the pond for continual use.

The 4 miles of dike average 15

(Concluded on next page)

Wire Rope at Work – This is the woodyard at Kraft Center, Cantonment, Fla., one of the largest enterprises of the St. Regis Paper Company. Here they build and move mountains – enormous mountains of logs. The stockpiles normally carry an inventory of 30,000 cords, and 1200 to 1400 cords are fed daily to the chippers at the paper mill.

The cranes you see in the yard are moving vast quantities of pulpwood, building up reserves so that the mill, with its healthy appetite for logs, will never go hungry. This is a job, too, for Bethlehem Wire Rope, which is rigged on the hard-working cranes. It is a punishing chore by any standard, the kind entrusted to Bethlehem rope in virtually every type of industry, wherever there's lifting or hauling to be done.

Bethlehem Steel Company, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

Mill depots and distributors from coast to coast stock Bethlehem rope for the following industries and numerous others:

MINING • CONSTRUCTION • PETROLEUM • EXCAVATING • QUARRYING • LOGGING • MANUFACTURING

BETHLEHEM STEEL — BETHLEHEM WIRE ROPE

Power Plant for Dixie

(Continued from preceding page)

feet in height with the top at elevation 153.0. Crown width is 15 feet. Side slopes on the pond side are 3 to 1; on the land side they are 2½ to 1. Normal elevation of the water level is 148.0 for an average depth of 10 feet.

A 4,052-foot baffle juts out into the pond from the dike on the west side. The baffle is constructed partly of creosoted timber and partly of earth. It divides the pond into two portions, one approximately twice the size of the other. The heated discharge water flows from the condensers through four 42-inch-diameter steel pipes to a transition block. From there, it continues through 919 feet of 84-inch reinforced-concrete pipe to a discharge structure located in the smaller division of the pond. The discharge has a maximum velocity of 8 fps under a head of 19.54 feet.

The temperature of the water is lowered as it circulates around the end of the long baffle to enter the larger portion of the pond. By the time it reaches the inlet structure for return to the plant, the water is down to about 90 degrees F maximum temperature during the summer months. Four circulating-water pumps supply the water to the condensers. The pumps discharge the water into four 36-inch steel pipes which connect into an 84-inch steel header. From there, the water is discharged into 612 feet of 84-inch reinforced-concrete pipe.

Dike Building

In constructing the dike, some 127,000 yards of material was first stripped away from the base area, while another 736,000 yards was required for the fill. The latter was obtained from borrow pits located inside the pond area not less than 800 feet from the dike; maximum depth of the cut was 3 feet. All fill was placed in 8-inch maximum lifts and compacted to 95 per cent density. The dirt moving was done by the Hooper Construction Co., Inc., Coral Gables, Fla., and Montgomery, Ala. Two 8-hour shifts were worked between 5 a. m. and 9:30 p. m. to speed up the completion of the dike sections.

The bulk of the excavation in the pits was done with a Euclid loader pulled by an Allis-Chalmers HD-19 tractor. Dirt was discharged into a fleet of 11 bottom-dump Euclids averaging 14 yards per load. Stripping of the pits and the base area of the dike was done with three Caterpillar DW10's and No. 10 scrapers. A half dozen D8 dozers were on hand for pushers, striking off the dump, or pulling the sheepsfoot rollers that compacted the fill.

Water from a small bayou nearby was sprayed on the lifts when necessary to further the compaction at optimum moisture. Two tank trucks were equipped with rear spray bars for this purpose. The final shaping and grading of the dikes was handled by a pair of Caterpillar motor graders. Two Kohlers and a Caterpillar 15-kw light plant were used for the night work.

Personnel

For Mississippi Power & Light, J. B. Fountain is chief engineer, and D. C. Lutken is plant superintendent. For Ebasco, W. W. Miller is construction superintendent, J. K. Bishop is construction engineer, and J. P. Pullen is resident engineer. A peak force of 750 men was employed on the project.

Hooper Construction was represented on the dirt work by Bill Copeland, general superintendent, and E. J. Holladay, night superintendent. THE END

Belt Conveyor Catalog

■ A new catalog showing the company's entire line of standardized belt conveyors is available from the Barber-Greene Co., 400 N. Highland Ave., Aurora, Ill. Each standarized component and accessory is illustrated and described with line drawings showing the relationship of the unit to the entire conveyor. The range of application of each unit is tabulated for quick reference. Catalog 76-A includes 60 pages of typical conveyor layouts and installation photographs.

The booklet presents the company's standardized drives, takeups, truss, idlers, and belting with a broad selection of each. Among the accessories listed are feeders, hoppers, conveyor supports, backstops and brakes, walkways, housings, belt cleaners, spouts, hoods, gates, trippers, and magnetic pulleys. A section on shuttle conveyors and stackers illustrates several economical stockpiling systems.

To obtain this literature write to the company on your company letterhead.

20 Second START
FOR STUBBORN DIESELS with
STAVIS STARTING FLUID
Pour or spray into air intake. Used by diesel operators everywhere. Some distributor territories still open.
Sure, quick starts. Save batteries. Save time. Save money.
Write for details today.
$30. PER CASE SHIPPED PREPAID
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(At top) New Zanesville Dam nearing completion, with the last cell in midstream being filled with concrete and remaining closure arc piling being driven by McKiernan-Terry Pile Hammer.

(In circle) Close-up of McKiernan-Terry No. 7 Double Acting Pile Hammer driving piles for one of the circular cells.

Zanesville, Ohio, needed a new dam—fast. The city's timber crib dam had failed, causing a drop in the water table of the municipal water supply and trouble upstream.

Dravo Corporation received a contract to build a new dam in 100 days—but they completed the work in 52 days—practically half the allotted time.

A McKiernan-Terry No. 7 Double-Acting Pile Hammer helped on this construction job by driving about 1500 steel sheet piles to bedrock for the concrete filled cells and closure areas which formed the dam.

Here, as in hundreds of other construction jobs on which speed as well as economy is important, a McKiernan-Terry Pile Hammer helped the contractor to better a desired performance.

OTHER McKIERNAN-TERRY PRODUCTS

MEAD-MORRISON COAL AND ORE UNLOADERS AND BRIDGES
Available in a variety of designs and in capacities of 300 to 1500 tons per hour. Exceptional durability proven by installations in service for half a century. Simple controls afford convenient, comfortable and speedy operation

GRAB BUCKETS
Range of types and sizes take bulk materials loads up to 25 tons. Ruggedness without excess weight.

HONING UP TO 42-IN. I.D. X 55-FT. LONG
Typical of the extensive facilities of McKiernan-Terry for unusual jobs.

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McKIERNAN-TERRY CORPORATION • MANUFACTURING ENGINEERS • 19 PARK ROW, NEW YORK 38, N. Y.
Plants: Harrison, N. J. and Dover, N. J.
MK 339

The Manco Guillotine hydraulic angular bolt cutter trims bolts flush to nuts.

Cutter Trims Bolts

■ A new hydraulic angular bolt cutter is announced by the Manco Mfg. Co., Bradley, Ill. The Guillotine line is designed to flush-trim bolts to the nut or to do other metal-trimming jobs where a close cut is desired.

The bolt cutter can trim up to ⅞-inch mild-steel bolts. It can be obtained with cut-back jaws for splitting nuts during wrecking operations or for trimming wire mesh.

Power for the cutter is supplied by a portable hydraulic pump. The unit is actuated by a manual lever which eliminates solenoid switches. The cutting head weighs 23 pounds.

For further information write to the company, or use the Request Card at page 18. Circle No. 350.

Variable Speed Drives

■ Two new types of infinitely variable speed drives for 20 to 25-hp applications are now added to the line made by the Link-Belt Co., 307 N. Michigan Ave., Chicago 1, Ill. In addition to the basic Model H-6 P.I.V. drive of 25-hp capacity, Link-Belt can now supply an HG-6 drive, furnished with either a single reduction input or single reduction output helical gear attachment, or an HGG-6 drive, furnished with both helical gear attachments.

Input gear reductions are available from 1.93:1 minimum to 5.82:1 maximum, and output gear reductions, from 1:1 to 6.33:1. Speed-increasing gear sets are also made.

The drives have many uses including metering and proportioning, synchronizing and timing operations, and conveyor-speed control.

For further information write to the company, or use the Request Card at page 18. Circle No. 405.

Transmitter-Receiver Set

■ A portable transmitter-receiver radio unit is described in literature from the Radio Corp. of America. The RCA Carfone Station Unit 15 is a complete, compact, two-way radio designed for use as headquarters station equipment in a mobile communications system in the 152 to 174 mc band. It is recommended for highway and construction jobs. A 117-volt 60-cycle source supplies power to both transmitter and receiver.

To obtain Form C. 302 write to the Engineering Products Dept., RCA Victor Div., Radio Corp. of America, Camden 2, N. J., or use the Request Card at page 18. Circle No. 406.

Shore Clamp for Lumber Of Varying Lengths

■ A simple shore clamp for scaffolding, staging, bracing, and propping is described in literature from the Super-Grip Anchor Bolt Co., Inc., 3333 N. 22nd St., Philadelphia 40, Pa. The Quick-Way shore clamp makes it possible to use any 4 x 4's available without the need to measure and cut them.

The clamps take a tension load as well as a compression load and will support up to 6,000 pounds.

The literature illustrates a number of possible ways to use the clamps for shoring. The 4 x 4's are clamped together to form a rigid shore. In the ribbon method, the lower shore members are first set up in place with the shore clamps already nailed on and braced with ribbons. The upper shore members are then laid against the lower ones, and the clamps are closed around both members. The upper members are then easily raised by a jack to the desired height.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 379.

In 1800, the world had only 36 cities with more than 100,000 inhabitants; the most recent counts shows 57 cities with half a million to a million inhabitants and 40 with a million or more each.

You'll be *Convinced in 3 minutes!

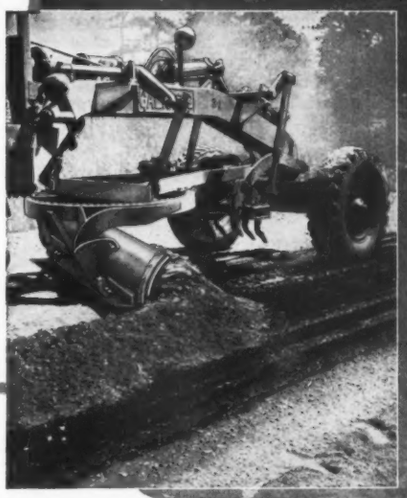
PROVE IT TO YOURSELF !

When you start a GALION Motor Grader thru its paces, you will *quickly* sense advantages over competitive Motor Graders. Because—

- SIMPLIFIED HYDRAULIC CONTROLS give you simplified operation.
- MANUAL STEERING WITH HYDRAULIC BOOSTER gives you ease of operation — minimum muscle work.
- LARGE FRONT TIRES give you extra clearance — less slippage — better flotation.
- GEAR TYPE TANDEM DRIVE gives you a *positive* four wheel drive.

*You'll be *convinced* that GALION Graders give you most for your money on any grading job.

Contact the nearest Galion Distributor for a demonstration—then drive it yourself to prove it to yourself.



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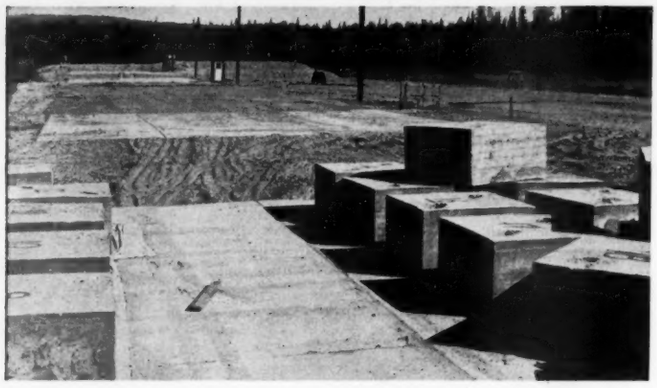
ROLLERS
- ☐ Tandem
- ☐ Three-Wheel
- ☐ Portable
- ☐ Trench
- ☐ Towing Attachment

PERSON ..... POSITION .....

FIRM ..... STREET .....

CITY OR POST OFFICE ..... STATE .....



These concrete blocks are being used in scientific pile-loading tests. In the background are the test slabs of airport pavements. *Ray Day Photo*

Corps of Engineers Investigates Frost

Permafrost lab studies cold-weather characteristics in search of better design criteria for frigid climates

ENGINEERS AND CONTRACTORS who have practiced stateside construction in the arctic, and even in the northern U. S., have long since learned that frost has a way of upsetting ordinary design criteria. Many structures built to theoretically good standards have failed to hold up under the extremes of air and ground temperatures encountered in the arctic.

The Corps of Engineers, U. S. Army, has been looking into this situation for the past five years. At the Arctic Construction and Frost Effects Laboratory five miles from Fairbanks, Alaska, a trained team of scientific test experts has been studying climatological and soil factors, along with other cold-weather characteristics. Its aim is better design criteria for all types of construction in frigid climates.

Investigational work is under way on a 146-acre plot of ground, underlain by permafrost, frozen permanently in winter and summer to depths of 100 feet or more. Temperature extremes—from plus 90 degrees in summer to minus 55 degrees in winter—make the site ideal for such a study. Started originally by the St. Paul District of the Corps of Engineers, U. S. Army, the work is now being carried on by the New England Division office, Boston,

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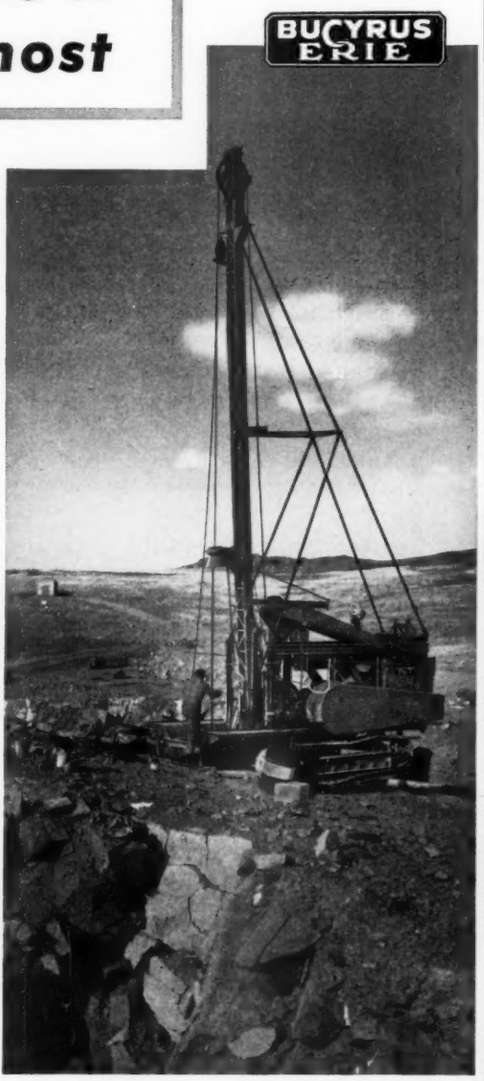
Here a Bucyrus-Erie drill pounds out hole in a rock pit. Derrick head shock absorber protects machinery from vibration — reduces cable wear by keeping shock loads down. A Bucyrus-Erie "first" the rubber shock absorber is the most successful yet devised.



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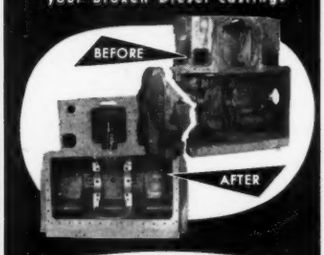

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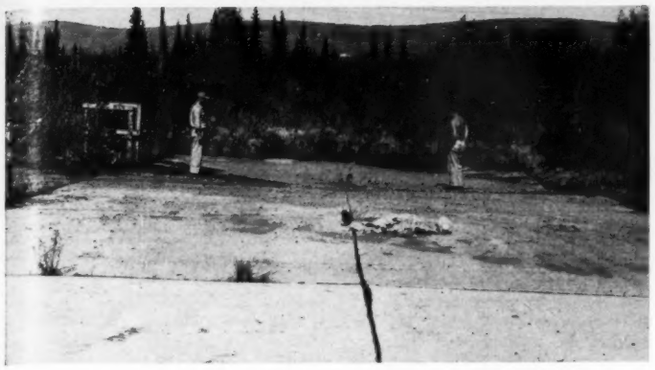

The white, unpainted, and black concrete slabs. Two men stand on black-painted slab which has settled about a foot at its center point due to heat transmission and thermal absorption. *Ray Day Photo*

Mass. Results will be disseminated later in the form of general information from the Office of the Chief of Engineers.

The object of the investigational study is the development of scientific information which will enable construction people to do a more dependable job. For example, a time-honored method in permafrost construction has been to install piles in steam-thawed holes. Though studies at the permafrost lab are not yet conclusive, there are indications that a long period of time elapses before the thawed ground immediately around such piles refreezes, particularly in subarctic regions. Translated into construction terms, this means a building contractor who sets the full load of a building on foundation piles set in steam-thawed holes is doing so at his own—and the building's—peril.

The chance of adjacent ground freezing to the piles is much greater if the hole is drilled. While this would seem a matter of common sense, traditional steaming methods have been used in permafrost regions because the necessary scientific data to back up the drilling theory is lacking. The Arctic Construction and Frost Effects Laboratory is working toward supplying that scientific data.

Branches Throughout Alaska

The permafrost lab operates subbranches throughout Alaska and, in cooperation with the Canadian government, at several points in Canada. The usual procedure is to set up the proper instruments at these branches to measure all climatological factors, ground temperatures, and physical condition and to note any special characteristics. At each of the 20 Alaskan stations, thermohm ground temperature assemblies have been installed to depths of 20 feet in drilled holes to obtain physical samples of the soil. Some holes descend 40 feet.

Ground temperatures of permafrost vary greatly from station to station. Permanently frozen ground at Fairbanks might easily measure one degree below zero, while the same formation at Point Barrow might be 15 degrees below zero, both temperatures measured in July or August.

In outlying sections, where there are personnel shortages and the establishment of stations is difficult, permafrost ground temperature installations are read regularly by observers of the U.S. Weather Bureau. In a few of the remote far north areas, native Eskimos have been hired to record what the delicate instruments show.

The major investigational installa-

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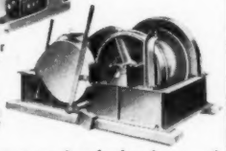

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Foundation Borer mounted on Gar Wood 75B crane.

New Foundation Borer Digs 397 Footings on Philadelphia Job!

Buckley & Co., Inc., Philadelphia contractors, are using a new Gar Wood foundation borer attachment to make unusually rapid progress on a contract to dig 397 footings for the new Eastern Pennsylvania Psychiatric Institute.

Jack Buckley, Jr., superintendent on the job, says, "This new machine is getting the job done 8 to 10 times faster than we've been able to do before. The independent controls make the machine extremely maneuverable and it certainly meets our needs for a fast, smooth-operating borer."

Working on a sub-contract from Turner Construction Co., the Buckley organization is boring down as deep as 55 ft. with the holes from 36 to 54 inches in diameter.

A regular Gar Wood model 75B crane with 85 ft. boom is fitted with the foundation boring attachment using a 70 ft. stem. Operating speed has averaged about 1 ft. per minute.

Close-up shows the smooth cut possible with a Gar Wood foundation boring attachment . . . When maximum desired depth is reached, vanes on bucket can be opened to bell out the bottom of the hole to a maximum diameter of 90 inches . . . This feature allows the hole boring and belling to be combined into one easy production line operation . . . Bucket is placed in operation with a rotating motion to load. When full it is lifted out of hole, vanes on bucket are opened to permit dumping. The entire operating cycle is completely mechanical.

Gar Wood's exclusive factory installed foundation borer attachment is completely convertible . . . Shown above mounted on a Gar Wood model 75B crane, it can be just as easily used with the 75BT truck crane or the standard 75A crane.

It can be utilized on a wide variety of applications including foundations, piers, caissons, piles, footers, ballast holes, buried tanks, wells, wall supports, soil borings, septic tanks, strata samplings, dikes and shores, and harbor and river improvements.

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(*Continued from preceding page*)

tion is at Fairbanks near Ladd Air Force Base. A tour of the area shows a number of interesting investigations under way. The effect of various coatings on a concrete slab laid on permafrost is being studied at one location, where three 6-inch reinforced-concrete pavements were placed under identical conditions, side by side. One of the slabs was painted black, one was left in its natural state, and the third was painted white. After several years time, because of heat absorption and thermal transmission, the black slab has thawed the permafrost and broken up, settling about 12 inches at its center point. The natural concrete shows less distress and the white-painted slab, only minor distress.

A general study, showing the effect of disturbing ground surface conditions over permafrost, is also under way. The study covers a considerable area and involves three general types of treatment. One of the areas under study is covered with a native growth of evergreen and low-growing timber. Permafrost in this section has remained frozen to within about two feet of the ground surface. In another section, the trees were cut down and the brush removed. Here, where summer sun rays were able to penetrate, the permafrost thawed so that the frost line receded to six feet below ground surface. In another section, brush and surface vegetation were stripped completely, resulting in permafrost recession to 11 feet below ground surface by midsummer.

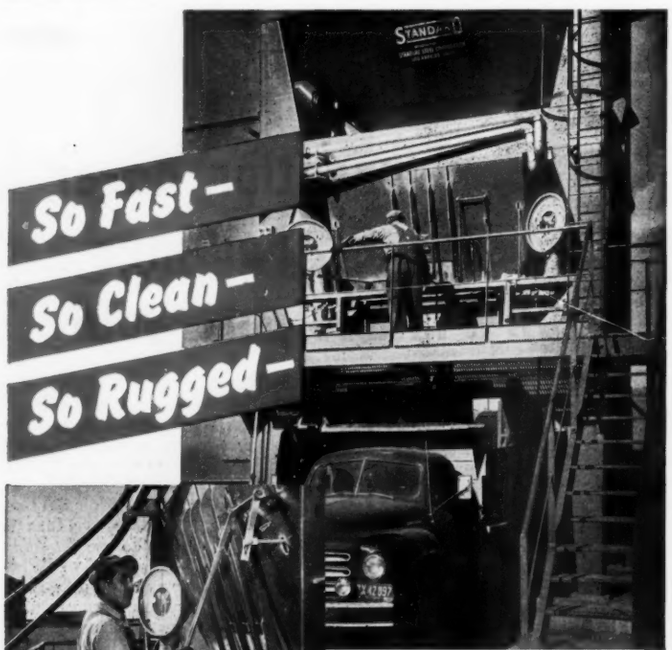
These, of course, are general figures and represent only a fair average of conditions uncovered by the study.

A number of varying types of temperature assemblies is installed at the Fairbanks area, in addition to 20 assemblies installed at outlying Alaskan weather stations. Permafrost lab investigators have found that thermal conditions at various points are best studied by different types of temperature assemblies and observing instruments. A major study at the Fairbanks station compares results of three types of temperature assemblies. These assemblies are all installed in a common test plot under relatively identical soil conditions, so that comparative performance data can be observed.

Wind Velocity Measured

A system of anemometers for measurement of wind velocity at various points above the ground has been set up, and carefully regulated thermometers have also been installed at various distances below ground level. One of the more interesting temperature studies consists of a moss-covered 16-inch pipeline filled with crude oil, laid along the surface of the ground. This study should be of special value to the Navy if the latter develops oil in quantity at its Point Barrow naval petroleum reserve. At the present time, the indications point toward the existence of a considerable amount of oil there. In fact, a more thorough pipeline study under these conditions is proposed.

A series of check wells 50 feet deep was drilled for a geophysical crew working in the vicinity. Strangely enough, marsh or methane gas was encountered in one of the wells. Data on soil condition, temperature, and physical analysis was



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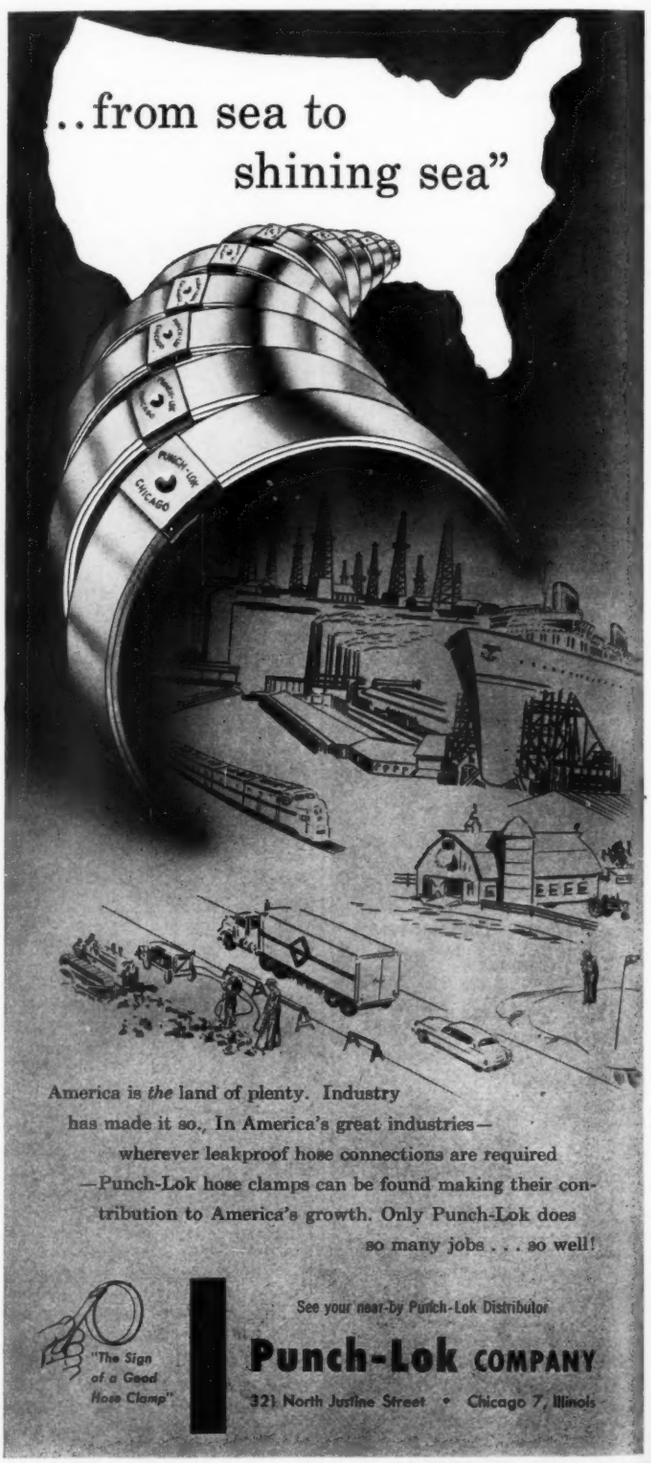

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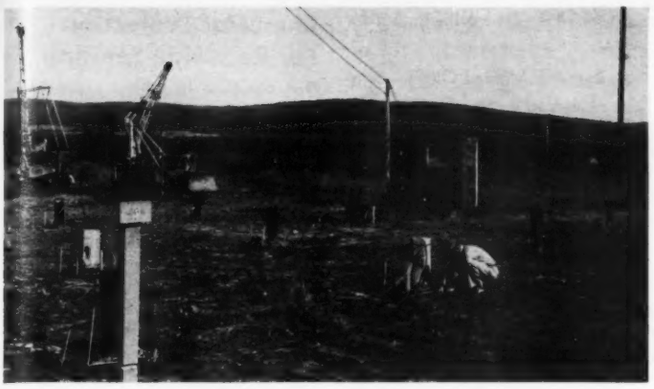

A system of thermocouples is inspected. The test piles will be pulled up later to measure the gripping action of permafrost. *Ray Day Photo*

noted and passed along to the seismic crew.

Observation installations have been established in selected locations on and beneath structures built by the Alaskan District, Corps of Engineers. Installations consist either of thermocouple or of Thermistor assemblies, ground water wells, and vertical movement observation points, which, in turn, are used to measure the rate and depth of thaw under, and deflection of, the completed structure.

A major study under way involves 26 airfield runway test strips. These sections, 50 feet square, consist of various types of pavement, laid on base-course materials from 4 to 12 feet thick. In many of the bases, insulating blankets, such as soil, concrete, brush, moss, and Foamglas, have been inserted. In connection with this test, wheel loadings have been run in an attempt to study pavement and subgrade deflection under various wheel-load characteristics. One of the pavement slabs, in fact, has been well broken up by heavy wheel loading.

Data Being Correlated

Data from this study is now being correlated at the permafrost lab. Before too long, new pavement design criteria may be developed for use in permafrost. One of the things already developed is an ability to predict seasonal frost penetration under various types of pavement when the mean low temperature and

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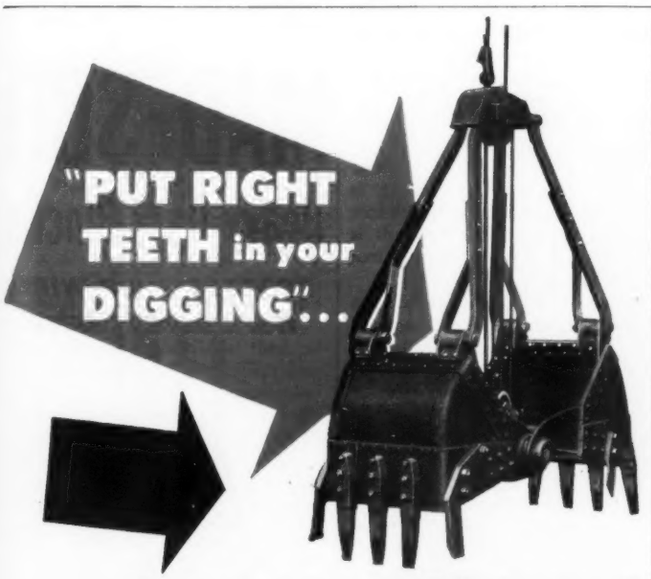

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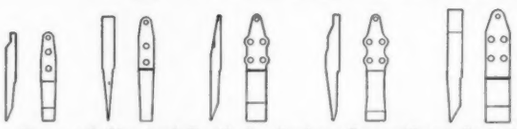

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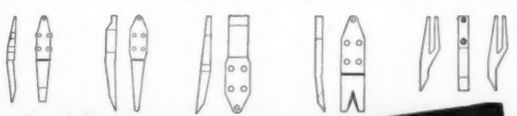
Owen teeth are designed especially for "deep penetration"—teeth that "grasp and hold"—teeth for "breaking down resistance at corners" to aid shell penetration—side teeth "to cut wall clearance" in trench excavation, etc.



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Corps of Engineers Investigates Frost

(*Continued from preceding page*)

soil conditions are known. Most of this study has already been worked out and thermocouples are now being installed to measure pavement surface temperatures approximately ¼ inch deep during the severe cold weather of the winter season.

A pile-loading test under permafrost conditions is under way in conjunction with the Navy. Two Union Metal Monotubes were driven 30 feet in permafrost and are now being loaded to destruction. Project officials estimate that ultimately 300,000 pounds total load can be applied to the pair of piles to produce destructive deflections. Deflections in excess of .004 inch per mile per 24-hour period will be considered the point of failure.

Careful measurement of surface temperatures by the strip chart method is being made of all typical arctic construction materials, including gravel, portland-cement concrete, and various types of asphalt pavement. These measurements, carried over a long period of time, should give design engineers much more accurate criteria for calculating frost penetration and paving behavior under arctic conditions.

An interesting study is also being conducted on piling, to check the amount of additional strength built up when soils refreeze around the piles. Wood piles, precast concrete, steel pipe, and steel H-beam units are being used. Piles were installed in steam-thawed holes and in core or churn-drilled holes. Enough piling is being used to give comprehensive results. The piles have been in the ground one year. Project officials expect to pull 24 units sometime before the end of 1953. One group of piles is in stripped ground, another is covered by shade to simulate actual conditions under a building, and a third group has been sunk in an area cleared of trees, but with natural brush cover untouched.

The piles will probably be extracted with heavy-duty hydraulic jacks mounted on steel beams and supported on timber cribs erected adjacent to the piles.

A great deal of money has been spent removing frost-susceptible permafrost materials from a building area. Results of present research may show it to be much cheaper to install cold-air ducts in the natural ground underneath the building, so that frigid blasts of arctic air could be circulated throughout the ground surface, freezing it solidly. In the summer, these air ducts could be shut off. The inherent cold factor of the frozen ground would then, in all likelihood, keep the foundation sufficiently solid to hold the building without deflection.

Construction at Thule, Greenland, has supported this theory. Work along same line is now beginning in Alaska.

Research-Minded Outfit

The nine-man group of technicians is a truly research-minded outfit. When it first moved in, eight small 16-foot-square buildings were set up under different conditions, in order that foundation studies could be made from the start. Some of the huts were set directly on the soil, some on a granular subbase, some on piles, some on pads and posts, and some on concrete blocks. Three large administration buildings have now been built, and they, too, have differing foundations which are being studied. Conclusive results leading to greater economy in arctic construction is expected. THE END

Hard-Facing Electrode

■ A new electrode suitable for hard-facing heavy construction equipment such as crushers, bucket teeth and lips, and ripper teeth has been introduced by the Stoody Co., 11936 E. Slauson Ave., Whittier, Calif. The manufacturer states that with the use of Coated Tube Stoodite, the rate of deposit is faster than can be attained with cast electrodes. The welded deposit is said to be smooth, sound, and free of pin holes or checks.

With chromium and molybdenum as its principal alloys, this material is said to provide good resistance to all types of abrasion and to have high compressive strength and excellent impact resistance. It can be welded to all carbon and alloy steels, including manganese. Deposits are semi-austenitic, and are not affected by ordinary heat-treat methods. Under normal ac or dc welding procedure, deposits show a Rockwell C hardness of 56-60. Properties are retained at temperatures up to 800 degrees F.

For further information write to the company, or use the Request Card that is bound in at page 18. Circle No. 448.

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■ A chemical to protect grass seeds from rotting or dying in roadside soil because of fungous organisms is made by E. I. du Pont de Nemours & Co., Wilmington, Del. Arasan is a seed disinfectant and not a fertilizer. It will not influence germination. The grass comes up thicker and stronger because of the protection against harmful organisms in the soil afforded by the chemical, which is technically named thiram.

Eight ounces treats 100 pounds of seed at a cost of about one cent per pound treated, according to an estimate by the manufacturer. Such an amount of seed will plant an area 50 x 1,000 feet.

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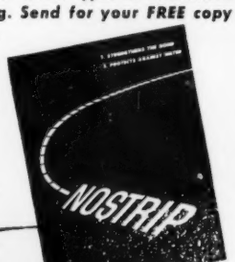

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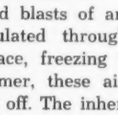

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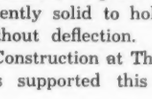

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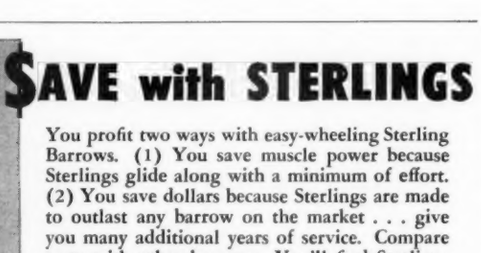

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■ An improved model of its printing calculator is announced by Remington Rand Inc., 315 Fourth Ave., New York 10, N. Y. The Model 99 calculator, a 10-key machine, provides quick solutions for material and cost estimates and produces a permanent tape record for any problem involving multiplication, division, addition, or subtraction.

Simpla-Tape, a new feature, provides positive proof of figure-work accuracy while showing only the essential figures of each problem. Superfluous steps are completely eliminated, but individual factors such as divisors and multipliers are easily distinguishable, while subtotals and totals are printed in red.

The calculator clears automatically at the end of each problem. It can, however, retain a multiplicand indefinitely if desired, to give the basis of constant multiplication.

A total-control feature facilitates accumulative multiplication. This feature is useful where multiplicands differ and the individual totals are not desired, as in the case of the computation of the net pay of an employee working at piece-work rates. A flick of the total control lever holds the individual totals of each hour times the rate extension until the final listing. Accumulated within the machine, they then appear as a grand total in red on the Simpla-Tape.

For further information write to the company, or use the Request Card at page 18. Circle No. 392.

Porous-Wall Drain Pipe

■ A porous-wall drain pipe designed for under-drainage and leaching is described in literature from the Walker Cement Products Co., Poroswall Pipe Division, Little Ferry, N. J. The pipe, made of portland cement, sand, and crushed aggregates, is porous for its entire length and circumference.

Designed with a self-sealing slip joint that does not require mortar of any kind, Poroswall Rapid Drain pipe is said to have less tendency to clog than other types. The pipe is made in 4 to 24-inch internal-diameter sizes. Also described in the literature are fittings available in stock, including 90-degree elbows, tees, 45-degree bends, and Y's.

To obtain this literature write to the company, or use the Request Card that is bound in at page 18. Circle No. 408.

Wood-Seal and Filler Is Fire-Resistant

■ A mastic seal and filler for wood-block floors, bridge decking, wood-plank platforms, or other inflammable surfaces is made by the Maintenance Engineering Co., 16 W. Johnson St., Philadelphia 44, Pa. The manufacturer states that the material, Meco 73, will not burn. It is claimed that when the material is heated sufficiently, the gases emitted tend to extinguish rather than feed the flame. Oil and acid-proof, Meco 73 will fill and seal pores in wood, preventing absorption of oils and greases which tend to increase the fire hazard.

The material can be used for resetting old or worn wood-block, or for building up slight depressions in the surface of the block. It is easily and quickly applied and dries in a few hours.

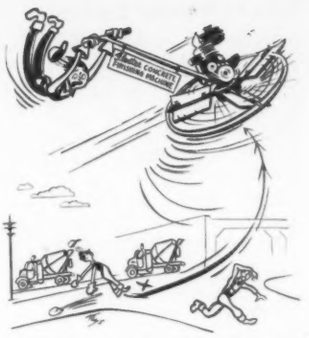
For further information write to the company, or use the Request Card at page 18. Circle No. 371.

Protective Clothing

■ Clothing made of Neoprene Latex that is said not to peel, stick, crack, or wear out easily, is announced by M. L. Snyder & Son, Boston Ave., Philadelphia 25, Pa. The Evergreen clothing line is coated inside and outside with Neoprene after the seams are sewn, so that the stitches are protected. It is recommended for protection against rain, salt water, paint, grease, oil, and gasoline.

The line includes jackets, long and short pants, coats, aprons, sleeves, leggings, and Sou'wester hats. It is available in a heavy weight for rough work and long service and in a medium weight for those desiring something thinner, cooler, and cheaper.

For further information write to the company, or use the Request Card at page 18. Circle No. 441.



"Which one of you guys changed the pitch of these blades?"

HY-LOAD

High-capacity, cylindrical roller bearings for heaviest radial loads and light or intermittent thrust loads. Produced in 3 diameter series, 2 widths and more than 800 sizes.

INDUSTRIAL INCH

Designed for slow-moving, heavily loaded machinery where large-diameter shafts are the rule. Accordingly, it is available in fractional-size bores for shafts from 4" in diameter upwards.

WOUND ROLLER

This is a three-part separable bearing available in various width classifications. The roller construction provides maximum resistance to shock, abrasion and fatigue.

BARREL

A series of angular-contact, self-aligning bearings capable of sustaining both radial and thrust loads. Race and roller curvatures insure ideal distribution of load, not only for normal operation but also for conditions of misalignment.

TRUNNIONED ROLLER

Ideal for industrial trucks, textile machinery, gear pumps, conveyors, hoists and agricultural equipment. Rollers have trunnioned ends which fit into holes in the end rings. End rings are located and held parallel by spacing bars which also guide and retain rollers.

DESIGNED FOR HEAVY DUTY...

HYATT ROLLER BEARINGS

...and there's a type and size for every need

Hyatt's complete line of radial and angular-contact bearings—*more than 800 sizes in the Hy-Load series alone*—makes the engineers' job easier, because it makes possible greater design flexibility. For the equipment *buyer*, this means longer bearing life and lower maintenance costs—with just the right bearings designed into every vital load-carrying position.

The next time you buy new equipment, or make a changeover, *specify lower maintenance costs by specifying Hyatt Bearings!* And if you need technical help in your selection of bearings, or desire information about particular bearings or their applications, ask for the services of a Hyatt sales-engineer. Call or write Hyatt Bearings Division, General Motors Corp., Harrison, N. J.

HYATT BEARINGS DIVISION • GENERAL MOTORS CORPORATION

Line of Grader Blades

■ Grader blades and cutting edges are illustrated in literature from the Colorado Fuel & Iron Corp., P. O. Box 1920, Denver, Colo. The booklet lists specifications for blades offered, including width, thickness, kind of section, length in feet, finish, and type of sharpening. The blades are made in beveled and square-edged flat and curved profiles.

In addition to the grader blades, other types of cutting edges can be furnished for drags, maintainers, graders, snow plows, bulldozers, scrapers, and carryalls. Also illustrated are blades for snow and ice-removal.

To obtain this literature write to the company, or use the Request Card that is bound in at page 18. Circle No. 403.

The Galion Model 12 dump body with the Davey Model 105 Auto-Air unit.

Dump Body Combined With Air Compressor

■ A new air compressor and dump-body unit is announced jointly by the Davey Compressor Co., Kent, Ohio, and the Galion Allsteel Body Co., Galion, Ohio. Both compressor and body are suitable for mounting on a wide range of standard motor trucks.

The equipment consists of a Davey Model 105 Auto-Air unit and a Galion Allsteel Model 12 contractors' body. The compressor delivers 105 cfm and is of two-stage air-cooled design. It is direct-driven from the truck engine by a heavy-duty power takeoff and occupies less than ¼ of the truck body space. The dump body is constructed of Galion's high-tensile steel. It is 90 inches long and 70 inches wide with 15-inch sides and 21-inch ends.

The first of Galion's line of dump bodies constructed of high-tensile steel was the recently announced Model 12-3 with a length of 8 feet and an over-all width of 90 inches. Body construction of high-tensile steel is said to make possible over-all weight savings of up to 25 per cent and to substantially increase corrosion resistance. In addition, the resistance to abrasion is improved and surfaces hold paint better.

For further information write to the company, or use the Request Card at page 18. Circle No. 374.

Rice Moves Headquarters

The Rice Pump & Machine Co., manufacturer of engine and electric - motor - driven self - priming pumps, has moved to new and larger quarters. The firm has moved from Grafton to Belgium, Wis. Floor space at the new plant is three times that of the old one.

Buy U. S. Savings Bonds

New Barber-Greene Film

"Conveyors Only Look Alike", a new 16mm sound film in color, describing Barber-Greene's complete line of portable belt conveyors, has recently been released by the company.

Three standard models of portable conveyors, a belt-type car unloader, plus many special units and accessories are shown. Job shots illustrate the engineering and structural features of the equipment and show its application to the handling of heavy, abrasive bulk materials. Production and cost data are cited.

Showings of the movie can be arranged by contacting any Barber-Greene representative. A print can be obtained on loan by writing to Wayne D. Adamson, Jr., Advertising Manager, Barber-Greene Co., Aurora, Ill.

Tuffy®
Increases
DOZER ROPE
Service 3 Ways!

Specially Created
DOZER ROPE
Reel Mounted
On Your Dozer

Here's how you save 3 ways. 1st, order ½ inch Tuffy Dozer Rope on 150' reels. It is specially constructed to last longer in tough dozer service. 2nd, mount the full reel on your dozer. Feed just enough Tuffy Dozer Rope through the wedge socket to replace the few feet that gets the wear on the drum. Keep on using the undamaged part. 3rd, repeat this procedure — avoid throwing away 40 or 50 ft. of Tuffy Dozer Rope while there still is a lot of service left in it . . . cut your down time in half . . . get longer service from Tuffy, the dozer rope specially constructed for dozer service. Users report savings up to 300%.

Mail Coupon
For More Information
on Tuffy Dozer Rope

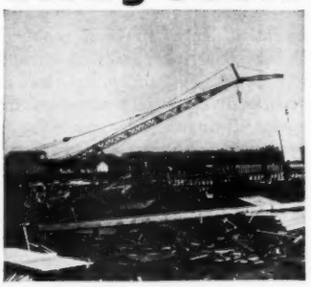
UNION WIRE ROPE CORP.
Specialists in Wire Rope and Braided Wire Fabric
2260 Manchester Ave., Kansas City 3, Mo.
Please send me the FREE illustrated folder on Tuffy Dozer Rope.
Firm Name
By Title
Address
City Zone State

BY CLIFFS . . . BY DOCKS . . . IN QUARRIES . . . OR ANYWHERE
IROQUOIS ENGINEERS
THE PLANT TO FIT
THE LOCATION

This Iroquois one and one half ton hot mix plant is erected against a sol'd stone cliff . . . bounded on the other side by river docks. *All* Iroquois complete Asphalt Plants are "bullseyed" to location . . . capacity . . . type of mix. Result? The maximum production obtainable . . . at operating costs lower than that of an ordinary stock assembly. Write for free bulletin today.

*Iroquois Division**
POSEY IRON WORKS, INC.
*Established over 60 Years
LANCASTER, PA.—New York Office: Graybar Building

Tuffy®
Saves Up to 40% on
Sling Costs

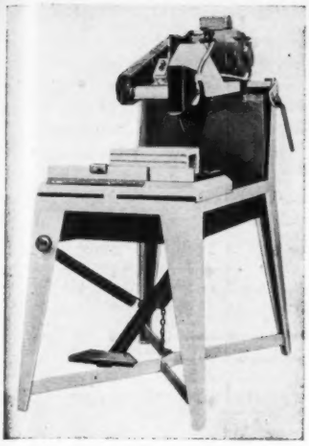


"Tuffy Slings
Are Easy To Work With"
Says Superintendent of a Missouri Construction Company (Name on Request)

Only Tuffy Slings give you the patented 9 part machine-braided wire fabric construction that resists knots and kinks . . . stands up longer than ordinary wire rope. Tuffy Slings can be repeatedly bent around small radii and abrupt corners. You'll find Tuffy Slings are extra flexible, extra strong — they're proof tested to *twice* the safe working load. Try Tuffy yourself and see the difference!

Write For
FREE Sling Handbook
Mail Coupon Today!

UNION WIRE ROPE CORP.
Specialists in Wire Rope and Braided Wire Fabric
2260 Manchester Ave., Kansas City 3, Mo.
Please send me the FREE Tuffy Sling Handbook and Rigger's Manual.
Firm Name
By Title
Address
City Zone State



Powered Masonry Saw

■ A new powered masonry saw is announced by the Victor Engineering Corp., 15 Maple Ave., Paoli, Pa. The machine is available in wet-cut as well as dry-cut models.

A front-end head-height adjustment gives various height positions while a turnbuckle set-up on the back bar allows infinite variations of head positions. The company's Feedmatic principle that eliminates operator guesswork as to the correct blade pressures has been retained in the new model.

For further information write to the company, or use the Request Card at page 18. Circle No. 435

Earth-Boring Machine

■ Literature is available on a tractor-mounted boring machine made by the Highway Trailer Co., Edgerton, Wis. The Model HD digs holes 9 to 20 inches in diameter to a depth of 7 to 10 feet. The earth-boring unit is constructed with a double train of gears, one of which rotates the auger while the other furnishes power to force the auger into the ground and to raise it.

The boring head and intermediate case have leveling mechanisms that permit quick adjustment to dig holes straight down, regardless of the position of the tractor or to dig at angles up to 90 degrees from the tractor. A safety feature is that the digging controls are always in neutral position until pressure is applied on either lever.

A 2,500-pound-capacity winch and a derrick that handles 40 to 45-foot poles are optional equipment. Power is supplied for the unit from the tractor engine through a special power takeoff which provides two forward and one reverse speed.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 383 .

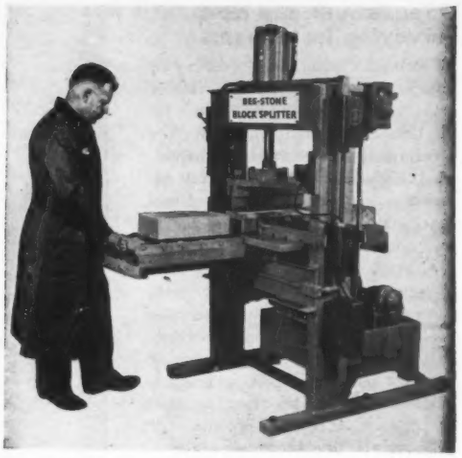
"Is engineering all you ever think about, Mr. Jones?"

Couplers and Fittings

■ Six-inch couplers and fittings have been added to the line of aluminum couplers for the portable industrial pipelines manufactured by the Wade Mfg. Co., 106 S. E. Hawthorne Ave., Portland, Oreg. The Quick-Lok couplers may be used with air, liquids, fuel, or chemicals, and they will handle any liquid not corrosive to aluminum and steel.

The complete line is described in a new folder that discusses the performance of the couplers on the job. The line now includes 2 to 6-inch couplers in two types: plain or with two threaded 1¼-inch pipe outlets. Self-draining and nondraining gaskets, plugs, pipe-to-tube adapters, tubing, etc., are also offered.

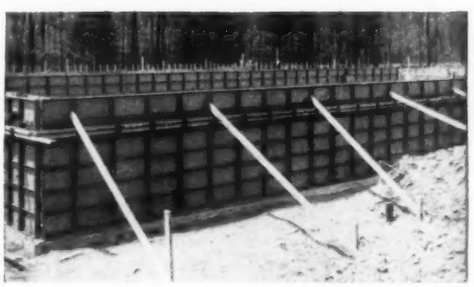
To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 366.



The Bes-Stone block-splitting machine cuts concrete block in a variety of sizes. The block is placed under the knife automatically and the blade descends by hydraulic action. The split block is ejected by the incoming block. The machine comes in two models: one for 16 to 18-inch blocks, and one for 24-inch pieces. For further information write to Besser Mfg. Co., Alpena, Mich., or use the Request Card at page 18. Circle No. 455.

Versatile

Atlas Compo Forms make any shape



Whether your concrete construction is rectangular, round, hexagonal, irregular, slab, battered – use the same quick-erecting, easy stripping Atlas Compo Forms over and over again for all the different shapes.

Tough, though lightweight, the panels consist of plastic-faced plywood framed and reinforced with pressed steel channels. You don't need walers, you don't need wood wedges, you don't have to drive any nails. One row of double 2 x 4's maintains alignment.

Easy to work with, a pleasure to handle, Atlas Compo Forms do a quicker, satisfactory, money-saving job. They eliminate on-the-job irritations.

Let's tell you more. Our engineers are glad to help with any concrete job or any form problem.

Seen our "Concrete Checker"? There ought to be one hanging in your office and in the construction shanty or toolshed. Free on request.

SOME SPECS. ON ATLAS COMPO FORMS

Heights, 4', 5', 6', 7', 8'.
Widths, 12", 16", 18", 24".
Panels interchangeable, no rights or lefts.
Panels of different heights can be combined.
For low, high, round, rectangular structures, and for slabs.
Pilasters, inserts, easily accommodated.
Inside and outside corners, steel fillers and special shapes available from stock.

IRVINGTON FORM & TANK CORPORATION
Compo Form Division
20 Vesey Street, New York, N. Y.

Ask us to send documented Case History Cost Data of on the job savings

Irvington Form & Tank Corp.
20 Vesey St., N. Y. C. Dept. C-12

Please send ☐ Folder on Atlas Compo Forms.
☐ Concrete Checker Card ☐ Man to see me.
☐ Cost Case Histories

NAME_____

FIRM_____

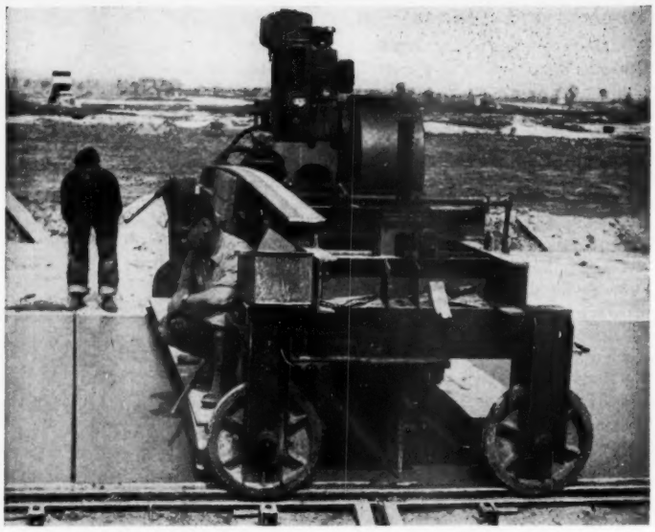
ADDRESS_____

Offer Rebuilt and New Surveying Instruments

■ Rebuilt and new surveying equipment is listed in a catalog from the Warren-Knight Co., 136 N. 12th St., Philadelphia, Pa. The brochure describes transits, theodolites, alidades, level rods, and accessories such as compasses, drawing instruments, protractors, scales, and slide rules.

A brief description of each piece of equipment is followed by notations on the price and appearance of the instrument. The company stresses that all instruments offered are in the best possible condition and adjustment. Purchases may be paid for in cash or by installments.

To obtain this literature write to the company, or use the Request Card that is bound in at page 18. Circle No. 423.



The Vibro-Joint-Cutter a Belgian machine, is available to the American market.

Storage-Battery Manual

■ Users of storage batteries for cycle service in industrial trucks and other equipment will be interested in the latest edition of a manual issued by Gould-National Batteries, Inc., Field Engr. Dept., 467 Calhoun St., Trenton 2, N. J. The booklet contains several new technical tables and illustrations of new battery tools and auxiliary equipment.

The manual begins with a brief discussion of the theory of the lead-acid battery. Four sections that follow give detailed instructions on the care and operation of batteries, maintenance and repairs, and the use of available standard and special parts.

To obtain this literature write to the company or use the Request Card that is bound in at page 18 Circle No. 436.

Joint-Cutting Machine Uses Vibrating Blade

■ A vibrating-blade concrete joint cutter that follows the finishing machine to cut expansion and dummy joints in freshly placed and compacted concrete is being introduced to the American market by Leon G. Rucquoi, 30 Rockefeller Plaza, New York 20, N. Y. The Vibro-Joint-Cutter is a Belgian import manufactured by the Societe Generale de Materiel d'Entrepreneurs of Antwerp.

It is reported the exact profile of the slab made by the finisher remains undisturbed, and the blade of the joint-cutting machine acts as an internal vibrator to densify the concrete in the vicinity of the joints. The machine is moved forward either by hand or mechanically. In the latter case it can be used for pulling the curing covers.

The Belgian concern also manufactures a one-man self-propelled road compactor that covers 500 to 600 square yards per hour. Other products include a concrete spreader and a finishing machine. The spreader, finisher, and joint-cutter are all extensible from 8 to 24 feet and can be converted from one width to another by means of a few additional parts.

The line also includes concrete mixers which, when fitted to supporting structures with receiving hoppers, make a central-mixing plant said to be low in first cost.

For further information write to Leon G. Rucquoi at the above address, or use the Request Card at page 18. Circle No. 389.

Wire-Rope Selection

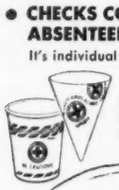
■ A brochure on the selection of the proper wire rope for a given job is available from the Leschen Wire Rope Division of H. K. Porter Co., Inc., 5909 Kennerly Ave., St. Louis 12, Mo. The booklet explains the differences in the selection of wire going into various types of rope and the differences in manufacturing processes.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 445.

Your men will work better...
when you serve plenty of cool refreshing water on the job

water served in Dixie Cups

- HELPS REDUCE ACCIDENTS due to heat and fatigue.
- AIDS EFFICIENCY the men work refreshed.
- CHECKS CONTAGION, ABSENTEEISM. It's individual service.



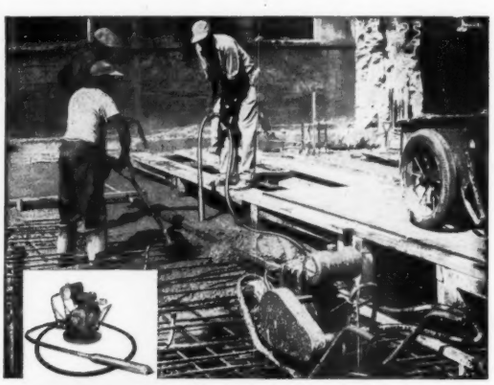
Dixie Safety Slogans will help your men become more safety conscious.

INSULATED DIXIE WATER CARRIER
Keeps water cool for hours
Available with dispenser for Dixie Cups of your choice. Use in central location—or it's portable with shoulder straps.

Dixie is a registered trade mark of the Dixie Cup Company

SEND FOR FREE ILLUSTRATED FOLDER!

DIXIE CUP COMPANY
Easton, Pa.



WHITE VIBRATORS OFFER LOWER OPERATING COSTS

INITIAL PRICE IS LOWER • ALL DRIVE SECTIONS ARE INTERCHANGEABLE • ALL VIBRATOR HEADS ARE INTERCHANGEABLE • LENGTH OF DRIVE IS UNLIMITED • ENGINE OR MOTOR POWER UNITS ARE OF STANDARD MANUFACTURE • MINIMUM OF SPARE PARTS REQUIRED • BACKED BY 20 YEARS OF SUCCESSFUL USE

For FREE circular, write—

Elkhart 9 White Mfg. Co. Indiana

THIS Quick-Acting HOSE COUPLING

combines outstanding strength and durability with light weight and compact design. Used for air and pneumatic tool hose; for hydraulic service at pressures up to 2,000 lbs.; and on hose handling non-poisonous, non-inflammable gases at pressures up to 1,500 lbs.

DIX-LOCK QUICK ACTING HOSE COUPLING

All locking heads completely interchangeable, regardless of male or female hose or I.P.T. size. To connect, press ends together and apply a quarter-turn. To disconnect, pull back locking sleeve and reverse the quarter-turn. Made in brass or cadmium plated steel, in ⅜", ½" and ¾" sizes. "Air King" Clamps are recommended.

Stocked by Manufacturers and Distributors of Industrial Rubber Products

DIXON Valve & Coupling Co.
GENERAL OFFICES & FACTORY—PHILADELPHIA 22, PA.
BRANCHES—CHICAGO · BIRMINGHAM · LOS ANGELES · HOUSTON
DIXON VALVE & COUPLING CO., LTD., TORONTO Associate Companies

The Lessmann line of front-end loaders features power-crowding.

Front-End Loaders Have Power-Crowding

■ Improvements in the line of hydraulic-powered front-end loaders made by the Lessmann Mfg. Co., 20th and Easton Blvd., Des Moines, Iowa, are announced. The hydraulic power-crowding of the company's loaders now exerts a forward thrust of 15,000 pounds while the unit is standing still. This permits the shovel-loading of frozen sand and aggregate and digging in unusually hard or compacted soils, according to the manufacturer.

The Lessmann loader will dig 12 inches below wheel level. Interchangeable buckets with capacities from ⅝ to 1¼ yards are available for the unit and attach by means of four steel pins. Other attachments include a crane hook, lift forks, and a dozer blade.

Bendix Hydro-Vac brakes, Vickers power steering, and an all-weather cab are optional equipment.

For further information write to the company, or use the Request Card at page 18. Circle No. 456.

Conveyor-Belt Device Meters Material Flow

■ Literature on a device for the continuous weighing of a steady flow of loose material on a conveyor belt is available from the Minneapolis-Honeywell Regulator Co., Station 64, Wayne and Windrim Avenues, Philadelphia 44, Pa. The Belt-Meter system has a large dial indicator and a chart which records the instantaneous weight of the material being conveyed as well as a counter reading of the accumulated tonnage. The material is weighed continuously without interruption of flow. An ElectroniK recorder and totalizer is used.

A schematic drawing in the booklet illustrates the installation of the various elements of the unit on a conveyor belt. The Belt-Meter is made by the Trans-Weigh Co., located in Wayne, Pa.

To obtain this literature write to the Minneapolis-Honeywell Regulator Co., or use the Request Card at page 18. Circle No. 422.

Engine-Starting Fluid

■ A fluid that will speed up the starting of heavy-duty diesel and gasline engines in cold weather is described in literature from the Sta-Vis Oil Co., 202 Eagle St., St. Paul 1, Minn. The manufacturer reports that with the starting fluid, engines can be started at 30 degrees below zero in 10 seconds to the point where they will run freely on regular fuel. A special ingredient in the fluid provides lubrication to cylinder walls.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 409.

Schoeller

ALUMINUM INSERTED DRAWING PAPERS FOR ORIGINAL PLANS

OFFER Extreme

- Durability
- Resistance to Climatic Conditions
- Dimensional Stability

Schoeller Aluminum Inserted Drawing Papers are now used in making original plans

FOR: Aircraft Industries
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and many other purposes where permanent original plans are needed.

Schoeller Papers may be obtained in sheets or rolls, depending on thickness; also with 1 white and 1 cream side.

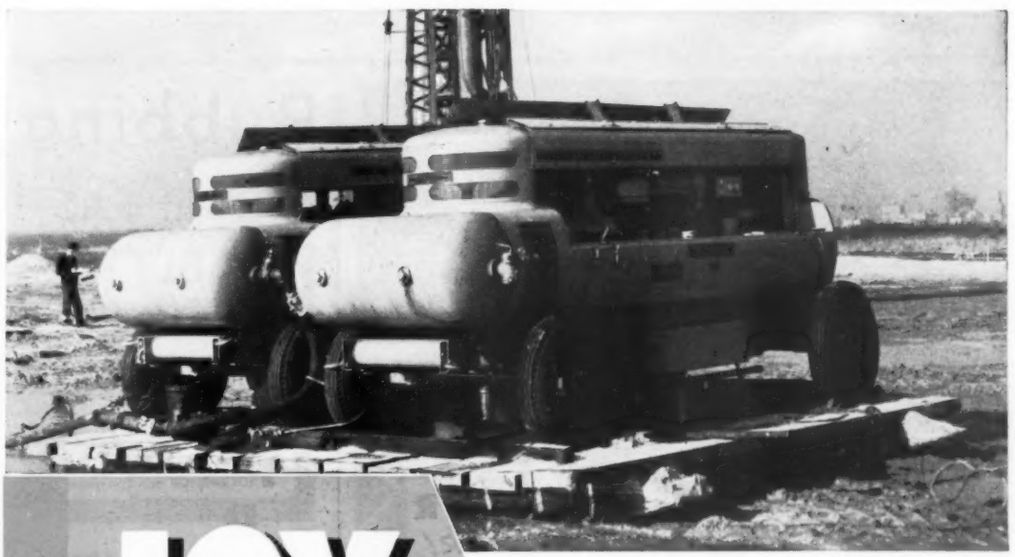
Write for sample and price lists to Dept. #3. Specially low priced sample orders available in rolls or sheets.

GEO-OPTIC CO. INC.

170 BROADWAY, NEW YORK 38, N. Y.

Here's the BIGGEST Portable!

Gives you 5% MORE AIR THAN ANY OTHER ON THE MARKET



JOY "630"

The Joy "630" is a *big* portable—output is 630 CFM—but it's designed for real portability. Light in weight, compact and rugged, the "630" is actually smaller than many other units of less capacity.

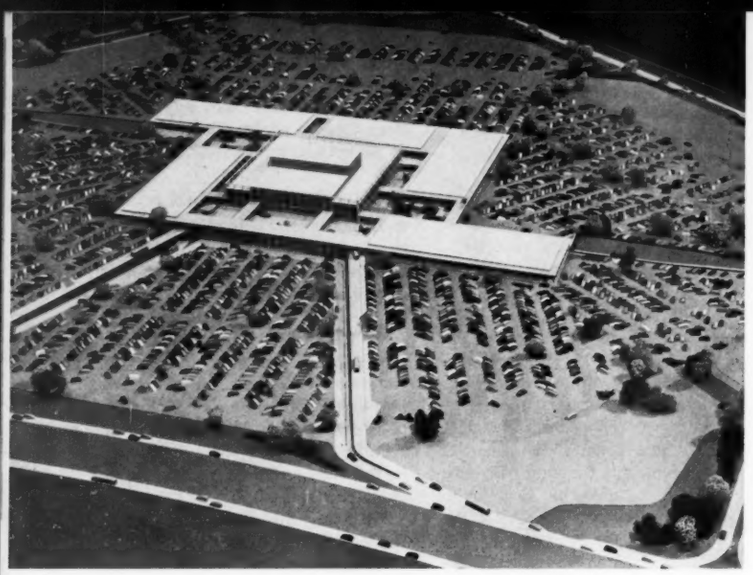
The Joy "630" is a completely self-contained compressed-air plant. Electric starter, full force-feed lubrication, "Cascade" oil cooling, two-stage compression, and many other advanced engineering developments enable it to out-produce all others. You'll find the Joy "630" a bear for work—it will operate *two* 4" wagon drills—and you'll find it able to cope with your heaviest air requirements. ● Write for Bulletin GG-1P. ***Joy Manufacturing Company, Oliver Bldg., Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

W&D C4633

Consult a Joy Engineer

JOY

CONSTRUCTION EQUIPMENT MANUFACTURERS FOR OVER HALF A CENTURY



Detroit's ultramodern Northland Center—one of the world's largest shopping centers. J. L. Hudson's branch department store is surrounded by five tenant buildings. Storage facilities in basement areas are keyed to a vast system of underground freight-truck passages.

Huge Shopping Center Covers 162 Acres

Detroit's Northland Center will utilize nearly 1,000,000 square feet of floor space to serve 500,000 customers

ONE OF THE WORLD'S largest regional shopping centers, designed to serve an area of more than 500,000 residents, is nearing completion on a 162-acre site in northwestern Detroit, Mich. Just off Eight Mile Road, Northland Center is being constructed for the J. L. Hudson Co., Inc., owner of Detroit's largest downtown retail store.

Ground for the $22,000,000 project was broken in May, 1952. The general contractor, Bryant & Detwiler Co., Inc., Detroit, expects to have stores ready for occupancy by early 1954.

The plans call for a group of one-story stores, shops, markets, and restaurants grouped around garden courts and malls. The central unit will be a three-story Hudson branch having nearly 500,000 square feet of floor space. Northland will be a complete, one-stop center where customers can fill every shopping need. There is to be an auditorium and other facilities available to civic groups.

All loading and delivery operations will be carried on out of sight or hearing of the public. There will be an extensive network of underground freight-truck passages, loading platforms, and service areas. The courts and malls are designed to give a park-like appearance.

Traffic Control

A parking area with a capacity of 7,500 cars will surround the shopping district. The way has been left clear for the addition of accommodations for another 5,000 cars if needed. Traffic from the five main highways that pass the center will be guided by a system of signals to the most convenient spaces. The area will be divided into nine sections for the handling of traffic. The

Low Cost **HOPTO DIGGER**

Digs, Trenches, Loads, *FASTER, EASIER!*

Hydraulically operated HOPTO is the *handy man on a hundred* jobs! Digs deep, lifts high thru full 180° swing. Conveniently located controls make the operation of a HOPTO Digger practically effortless.

Skeleton type and half-shell buckets handle any type of soil. Back-hoe and shovel buckets are quickly interchangeable. HOPTO may easily be equipped with a crane for grapple or hook work.

Here are some of the jobs that HOPTO can do for *YOU* . . . at lower cost and with lower equipment investment: Excavate for footings and foundations, dig ditches and trenches, spot timbers and steel, handle aggregate, load rock and building stone . . . and hundreds of other tedious jobs that become profit pushovers when HOPTO 'hops to'!

MODELS FOR EVERY USE

HOPTO is available as a self-powered trailer-type unit, as a truck or crawler-type tractor mounted unit and as a trailer type to operate from the power take-off of tractors, trucks or jeeps. Get complete specifications.

WRITE TODAY!

for complete information on the model to meet your needs.

BADGER MACHINE CO.

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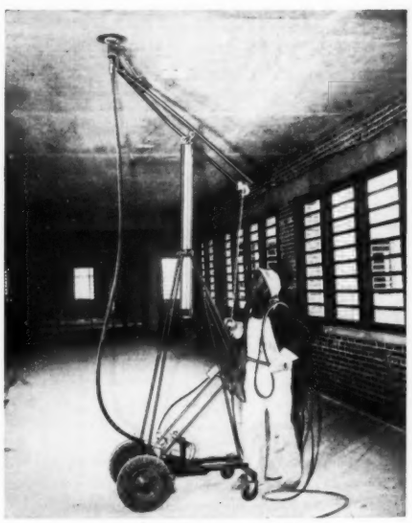

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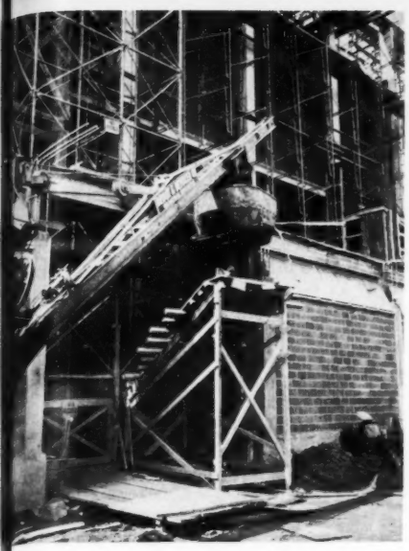


A bucket of concrete from the elevating boom on the Ransome paver is dumped down a chute into another bucket at the bottom of the tower hoist. *C. & E. Photo*

Two large courts flanking the department store will offer sheltered resting places and a glazed-in snack bar. Other facilities being built include a truck tunnel, garage, switch house, package building, service station garage, restaurant, and general office, research, and medical buildings.

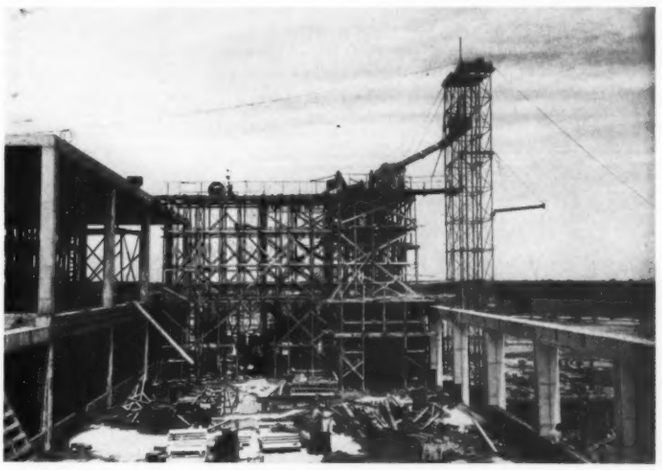
Preparation Work

Bryant & Detwiler subcontracted all clearing, grading, and excavation work to the C. J. Rogers Co., Inc., Detroit. Shovels and dozers cleared about 160 acres of farm and wooded area, burning the material. Topsoil was stripped from the central section and stockpiled.

Excavation for the 15-acre basement and grading of the surrounding area was done by about 20 Caterpillar and LeTourneau scrapers averaging about 25,000 yards of material per day. Four Caterpillar D8 pushers loaded the 14 to 20-yard units. Earth was dumped in one-foot lifts, spread with graders, and compacted with sheepsfoot rollers. Water wagons sprayed water on the fills to aid in achieving maximum

(*Continued on next page*)

From the Universal tower hoist, at right, the concrete is chuted into a Jaeger hopper at floor level. From there, hand buggies transport the concrete to the forms. *C. & E. Photo*



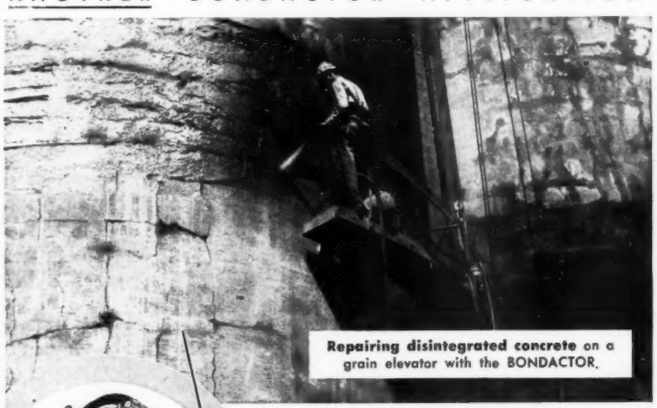
furthest parking will be no more than 500 feet from the building area.

The shopping area will contain six reinforced-concrete frame buildings with red brick exteriors. The Hudson building will have exposed exterior columns covered with 2-inch-thick white stone. The five one-story tenant structures surrounding the Hudson store measure approximately 400 x 160 feet. Their combined floor space is about equal to that of the main building, giving the shopping center a total of nearly 1,000,000 feet of floor space.

Hudson's will be completely air-conditioned. Chilled water from a refrigeration plant will be metered to tenants who install their own air-conditioning. Another plant will provide steam which will also be metered to tenants.

The buildings are to be surrounded and connected by paved walks.

ANOTHER BONDACTOR APPLICATION



Repairing disintegrated concrete on a grain elevator with the BONDACTOR.

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Make repair and restoration of disintegrated concrete one of your most profitable operations. With the BONDACTOR you can complete such jobs faster, easier and make more money than ever before.

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Model 750 — Capacity: ½—¾ cu. yd. per hr. Operates with 75 or 105 CFM compressor

Model 1250-S — Capacity: ¾—1½ cu. yds. per hr. Operates with 105 CFM compressor.

Model 1250-L — Capacity: 1½—3 cu. yds. per hr. Operates with 210 CFM compressor. Capacities vary with material being gunned and with specific operating conditions.

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State intended use and materials to be gunned.

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(Continued from preceding page)

compaction.

After the basement was excavated, three backhoes moved in to dig footings. Over 100,000 yards of clay was removed and wasted. Then the basement area was backfilled with sand. Barber-Greene and Cleveland trenchers were used to get things ready for the laying of miles of pipe for utilities, chill water, and drainage.

Footings range from 6 to 12 feet square and were carefully excavated to eliminate the need for forms. For the basement floor, a 6-inch sand blanket was covered with a 5-inch mat of concrete. Wherever possible, transit-mix trucks hauled the concrete directly into the basement. In inaccessible spots, the concrete was mixed in a Ransome paver and was carried to the pour in self-propelled Kal-Truks with 16-cubic-foot buckets. Whiteman four-blade rotating finishing machines completed operations on the floor surface.

The Butler batch plant. A Bay City crane charges the aggregate bins while Trailmobile bulk-haulers, pulled by a GMC tractor, unload cement.

A removable tin-pan system is being used on the three floors above ground. Rib sections of the floor vary from 10 to 14 inches, and shell sections are about 2½ inches thick. The floor forms are supported by 4 x 4 wood shores. Concrete on the first floor was placed directly with bottom-dump buckets handled by Bay City cranes. Generally, the columns were poured before the slabs. In the main building, the columns average 2 feet square and are spaced on 30-foot centers. Forms were stripped after six or seven days.

Hoisting Concrete

Concrete for the upper floors is mixed in Ransome pavers and hauled up in one of two double Universal tubular towers with American hoists. One tower is on each side of the building. Concrete is mixed in the paver, dumped into the bucket, carried up on the elevating boom to a chute, and dumped down the chute to a bucket inside the tower.

When loaded, the bucket is hoisted to the proper floor and dumped automatically at a chute leading to a Jaeger two-chute hopper. From here, the concrete is hand-buggied across a catwalk to the pour. The 120-foot towers are also used to hoist brick, plaster, and similar materials to the upper floors.

Other uses are also being found for the Ransome single-drum pavers. Because of their high-lift booms, they have been used in several areas around the buildings to pour walls up to 18 feet high.

Winter Work

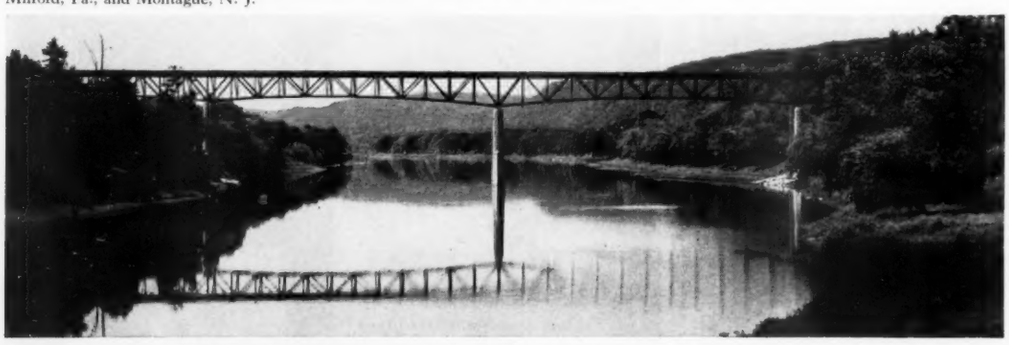
Although most of the concrete work was done during the winter, Bryant & Detwiler was able to average over 6,000 yards per month. Cold weather work, however, required special precautions. Up to 1,000 tarps and seven 1,500,000-Btu-capacity National space heaters were used to keep the cold away from the freshly poured concrete. The oil-fired portable space heaters were used on the floor below and moved with each pour. Each unit was supplied with a 1,000-gallon portable oil tank that could fire a heater over an entire weekend.

Batching of both the aggregates

Superstructure of bridge crossing the river at Delaware Water Gap. *Below:* Bridge across the Delaware between Milford, Pa., and Montague, N. J.

Three New Bridges Span the Delaware

To provide greatly increased facilities for crossing the upper Delaware River in the general area of the Delaware Water Gap, three new bridges together with elaborate approaches have been built for the Delaware River Joint Toll Bridge Commission. Steel for the bridges and the approaches, shown under construction, was supplied by Bethlehem, and included piling, fabricated steel, reinforcing bars, dowel units and bar mats.



Bethlehem Reinforcing Bars come to the job site at Portland-Columbia bridge, ready for immediate placing.

Right: Paving one approach to bridge across Delaware river connecting Portland, Pa., and Columbia, N. J.

Below: Bethlehem Dowel Units being installed in the Pennsylvania approach to the Delaware Water Gap bridge. Contractor: George M. Brewster & Sons, Inc.

J. E. Greiner Co. were the engineers, and Johnson, Drake and Piper, Inc., the general contractors, for the substructure of the three bridges.

Paving contractors for the approaches were A. L. Rake and Son and G. H. Litts (for the Milford, Pa.-Montague, N. J. bridge), George M. Brewster & Sons, Inc. (for the Pennsylvania approach to the Delaware Water Gap bridge), and S. J. Groves and Sons Co. (for the Pennsylvania and New Jersey approaches to the Portland-Columbia bridge, and the New Jersey approach to the Delaware Water Gap bridge).

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Bethlehem Products for Bridges and Highways include: DOWEL UNITS • REINFORCING BARS • BAR MATS • GUARD RAIL • GUARD RAIL POSTS • WIRE ROPE AND STRAND PIPE • HOLLOW DRILL STEEL • SPIKES • BOLTS AND NUTS TIMBER BRIDGE HARDWARE • TIE RODS • SHEET- AND H-PILING • FABRICATED STRUCTURAL STEEL

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and cement is handled by a Butler four-compartment combination bin. Aggregate bins are kept filled by a Bay City clamshell crane. Cement is handled from a 150-barrel bin in the same plant and is stored in a 400-barrel auxiliary silo. Six to eight two-batch trucks haul to the pavers. A 5½-bag mix is used for footings and a six-bag mix for the rest of the building. A typical six-bag mix contains:

cement	705 lbs.
sand	1,805 lbs.
gravel	2,413 lbs.
water	31 gals.

One of the more important types of equipment on the job is fork-lift trucks. They handle lumber, blocks, brick, tile, and mortar boxes. In some cases, they are even being used to set stone lintels. Up to five machines are kept busy most of the time. They include 2 Ross 8,000-pound units, a Ross 5,000-pound unit, and 2 Clark 2,000-pound units. Most of the brick is handled from Safway tubular scaffolds.

Personnel

John Cambell is general superintendent for Bryant & Detwiler Co. Victor Gruen is the architect.

THE END

Line of Hauling Trailers

■ A line of trailers including flat and low-bed heavy haulers is illustrated in literature from the W. C. Nabors Co., Mansfield, La. The platform trailers are shown with rated frame capacities of 35,000 and 45,000 pounds. Three types of low-bed trailers are illustrated with ratings from 24 to 32 tons. A spring-mounted front dolly may be used with both models.

The company also makes self-loading machinery trailers in 24 to 28-foot lengths. Single-axle models are rated at 35,000 pounds while tandem-axle units have a capacity of 50,000 pounds.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 396.

Powered Wheelbarrow Features Attachments

■ A powered wheelbarrow that carries up to 1,500 pounds is described in literature from the Prime-Mover Co., Sampson St., Muscatine, Iowa. The Model 15, latest in the line of Bell Prime-Movers, is offered with a steel bucket that holds 10 cubic feet (or 18 cubic feet with side boards). The bucket is released and dumped with a convenient foot pedal. A rigid steel platform may be used in place of the platform. Two sizes of 9 and 14-square-foot areas are available, each equipped with stake sockets. Also made for the powered unit is a blade attachment that can be used for yard maintenance and for clearing snow from walks and driveways. Chains and dual wheels may be added for rough going.

Features of the unit described in the booklet are the 5-hp Wisconsin power source, the rear caster-wheel that turns 360 degrees to provide a turning radius of 33 inches, and the conveniently mounted controls. The 532-pound unit is equipped with direct forward drive and half-speed reverse.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 412.

Tractor-Mounted Backhoe

■ A tractor-mounted hydraulic backhoe is described in literature from the Henry Mfg. Co., Inc., 1700 N. Clay St., Topeka, Kans. The unit is recommended for work on ditches, culverts, trenches, footings, and foundations. It is said to operate on almost any tractor.

The machine is available in two models with maximum digging depths of 7 and 8 feet. An interchangeable shovel bucket, also available, gives both models a maximum loading height of 9 feet.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 429.

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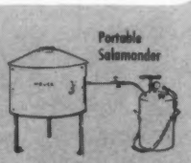

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EASIER and FASTER! Unit 357 Mobile Crane Eliminates Stationary Elevators . . . Saves Man Hours on Factory Roofing Job.

Primarily this roofing job would require the erection of a scaffold-type elevator to hoist wheelbarrow loads of slag pebbles, plus a crew of men to load and unload the wheelbarrows. This means loss of setup time and duplication of handling. Now, with a UNIT 357, you drive up to the job — hoist the storage hopper to the roof — fill the hopper and the job is started. When insulation, roofing paper or other supplies are required, the UNIT 357 can move around the building to any location and hoist the material right on the spot where it's going to be used. Mr. Contractor, compare these two methods of material handling. Turn your lost time into PROFITS with UNIT.

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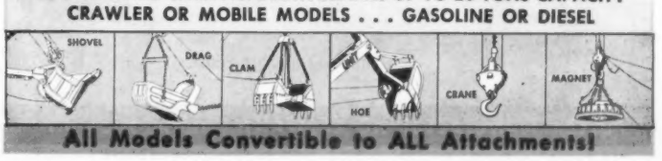
CRAWLER OR MOBILE MODELS . . . GASOLINE OR DIESEL



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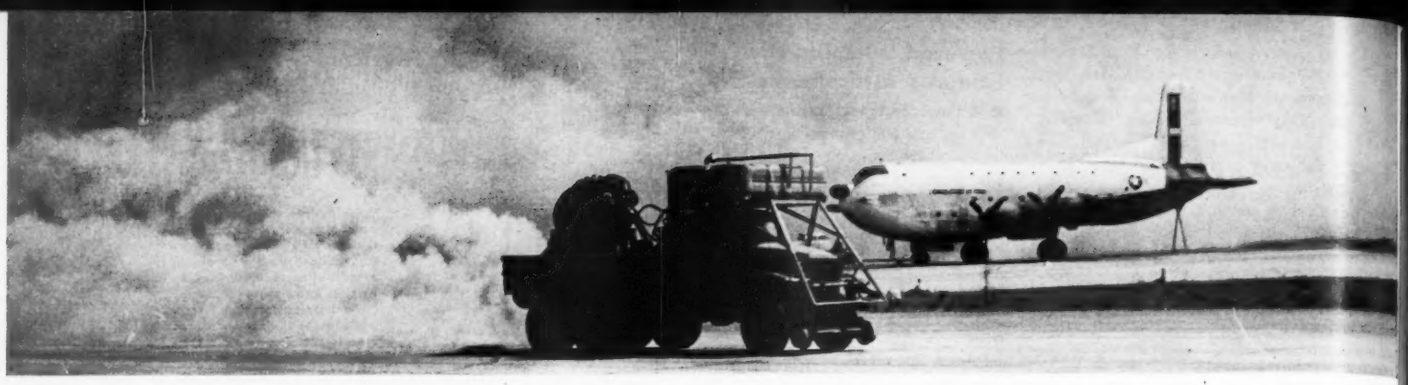


Airport Maintenance Is Tough in Alaska

Air Force crews battle dust, sub-zero temperatures; prove cold climate is no barrier to strategic airfields

AT 30 DEGREES BELOW zero last winter, with 9 feet of frost in the ground and snow and ice on it, jets of the U. S. Air Force and propeller-driven civilian planes used Elmendorf Air Force Base at Anchorage, Alaska, just as though it were mid-summer. When a volcano, Mt. Spurr, blew its top early in July, scattering volcanic ashes and dust a half inch thick, Elmendorf was able to resume normal operations in less than six hours.

Despite extremes of climate and weather, despite the uncertainties of military operation, Elmendorf is maintained in such fine shape that pilots don't mind using the field no matter what the season.

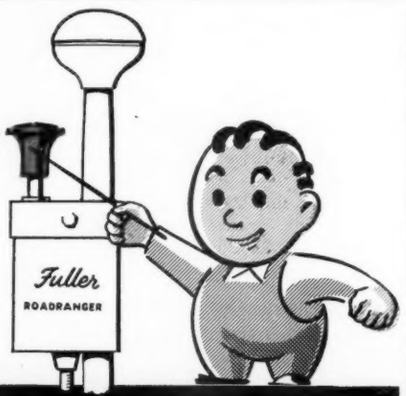
Big Air Terminal

Elmendorf field is a big air terminal by any standards. It has two portland-cement concrete runways and more parking apron and hardstand areas than are represented in the runways. The field is located on a 12,000-acre plot of ground underlaid by approximately 100 feet of glacial gravel. The subgrade condition is generally excellent. Even though frost often penetrates to depths of 9 feet and more, not too much damage from it has been encountered. In summer, water drains out of the material so well that the drainage pattern consists of drain lines and shallow sumps; major outfall or storm sewers are not needed.

Because of this favorable condition beneath the airfield pavement,

Lt. Col. Ralph Pastor handles one of his daily problems by telephone. *Ray Day Photo*

...take your choice



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...e of the two truck-mounted jet engines blows ...dery volcanic dust off a runway at Elmendorf after ...s eruption of Mt. Spurr. *U. S. Air Force Photo*

Fuel for the jet engine is loaded into two tanks mounted on the truck cab. Under extremely icy conditions, the jet tailpipe assumes this position to blast the ice on runways. *Ray Day Photo*

there never has been a subgrade problem. Airfield maintenance is more a matter of surface maintenance in extremes of weather. Other conditions complicate the surface job. Jet fuel spillage in some of the asphaltic concrete hard-stand areas has diluted the paving asphalt so severely that topping and half-sole paving is a regular chore.

Wheel loads at Elmendorf are about equal to anything handled on stateside runways. In addition to jet fighters and both medium and heavy military bombers, many civilian planes use the field from time to time. Heavy Boeing Stratocruisers, which are used by Northwest Airlines on its Orient Express run, currently land at Elmendorf.

All-Military Setup

The airport maintenance activity is part of the air installations branch in the over-all military organization at Elmendorf. It is headed by an experienced veteran ex-highway engineer from New York, Lt. Col. Ralph Pastor. Col. Pastor is not only the air installations officer but also the squadron commander of the 5039th Installations Squadron.

Airport maintenance crews under Col. Pastor usually consist of a few key civilians plus the military personnel. Aviation engineer units are at Elmendorf to get valuable practice in airfield maintenance and construction. A Barber-Greene asphalt plant, an overseas-type rock crushing and screening plant for aggregate production, and a Barber-Greene asphalt finishing machine used in resurfacing are operated by aviation engineer personnel.

Surface Maintenance

Surface maintenance at Elmendorf is a steady battle with the elements. In spite of the cold-climate nature of the base, dust is a major problem; the annual precipitation is only about 16 inches. To combat dust, Col. Pastor's men have attacked the problem at the source. Control on the runways, they realize, must begin some distance back from the paved areas. With this in mind, they have commenced a comprehensive basewide dust-control program. Key streets and roadways have been oiled or paved. Traffic is channeled onto these streets and roadways, and dusty side roads which are not necessary for the normal flow of traffic are closed to automobiles by means of ditches bladed by motor graders or by other approved barricades.

In addition to this first-line work on the base, lightly-used streets are dust controlled with calcium chloride, asphalt penetration work, applications of used crankcase oil, or sometimes with water sprinkling.

(Continued on next page)

This immensely heavy crane rolled repeatedly over the U.S. Royal Cord Air Hose in left foreground. Hose remained unharmed, even though ground was paved with sharp shells.

Meet the U. S. Rubber Hose they couldn't squash or cut!

In the 14 months it took to build a large aluminum plant in Texas, U. S. Royal Cord Air Hose took a beating which amazed construction men. 50-ton cranes on tractors, trucks carrying steel girders or gravel, ran over it again and again. *No cribbing was used.* The pavement was surfaced with very sharp and abrasive oyster and clam shells. Yet the hose suffered no damage, not even when carrying 125 pounds of water closed off at the end! Weathering and salt air had no effect on it. What's more, every foot of the hose is now being used in the finished plant.

If there ever was a hose you can thoroughly abuse, U.S. Royal Cord is it. You don't have to waste time and money cribbing it. Move it about at will. It's the only cord hose built with true tire construction.

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A Lorain crane unloads a heavy Westinghouse transformer from a flying boxcar. Heavy wheel loads such as this make Elmendorf maintenance a never-ending job.
U.S. Air Force Photo

Airport Maintenance Is Tough in Alaska

(Continued from preceding page)

Grass Program

Under a joint operation with the Civil Aeronautics Administration, an experimental grass program has been started at nearby International Airport. As soon as the best grass can be chosen from the many types planted, it will be used at Elmendorf to control dust immediately off the runways.

The toughest campaign against dust ever undertaken was in progress when CONTRACTORS AND ENGINEERS visited Elmendorf. Mt. Spurr, an active volcano only 70 miles west of the field, had erupted. By nightfall, the field was covered with about ½ inch of fine cement-like volcanic dust. The powdery black silica particles were a threat to every airplane engine at Elmendorf. Quickly, every man, power broom, hand broom, and practically every other implement on hand was mobilized to combat the dust.

Some time before, two jet engines from obsolete F-80 fighters had been mounted on trucks and their heat blasts used with great success in thawing out railroad switches in sub-zero weather. One of these machines was immediately available. Col. Pastor ordered it into action to help in the emergency. The machine performed so well that all hand labor and tools were abandoned in favor of the jet.

How Jet Worked

The engine had been mounted so an operator could turn the tailpipe through about 20 degrees. When it was started, the blast of the discharge picked up dust from a 30-foot swath and blew it skyward. Crosswinds caught the powder and drifted it away to the side. The second jet was soon located and pressed into service. When Elmendorf was cleaned up, the two machines moved over to International and helped the CAA tidy up over there. The main runway at Elmendorf, plus most of the parking space, was cleaned in about five and a half hours.

The two jet engines have also been used to good advantage in winter, particularly under icy conditions. With tailpipes set at a sharp angle of impingement, the red-hot blasts are able to devour ice almost impossible to move by other methods.

The removal of snow is a routine winter problem and is handled so expertly that flights are able to operate on uninterrupted schedules. Snow removal is a job for pushplows, one or two V's, and five Snogo three-auger rotaries. All the equipment is owned and operated by the Air Force. If snow falls while a sharp crosswind is blowing, clearing operations start at one side so the wind can be used to advantage. If the air is calm, the first cut is made down the center line of a runway. When snowbanks build up along the edges of the pavement, the material is hauled away by tractors and scrapers.

An interesting sidelight to winter maintenance work is a study recently conducted by the Air Force. Using a temperature of 55 degrees as a normal man-hour base, the study showed that 50 per cent more man hours was needed to do the same work at zero degrees, 75 per cent more was needed at 20 below, and 110 per cent more at 40 below. Beyond 40 below, work becomes practically impossible. The same rules apply to the efficiency of the maintenance crews.

Surface Repairs

The short season from June 1 to September 1 is the time for high-type asphalt maintenance jobs. Two principal types of surface repair are used on the asphalt revetment areas: hot-mix half-sole work and penetration-type treatment. Usually the damage from jet fuel spillage is so great and moves so fast that entire half-sole jobs with asphaltic concrete are the answer.

Aviation engineer troops produce their own hot-mix mineral aggre-

2 ways to make crane operations pay more

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Power for garden tractors, mowers, pumps, sprayers, snow removal equipment, elevators and hoists, mobile saws, concrete mixers, compressors, feed grinders, industrial and lift trucks, and a wide range of tools and equipment for industry, construction, farm and home.

Engineered and built to the quality standards that have won acceptance for Kohler Electric Plants the world over.

Kohler Co., Kohler, Wisconsin
Established 1873

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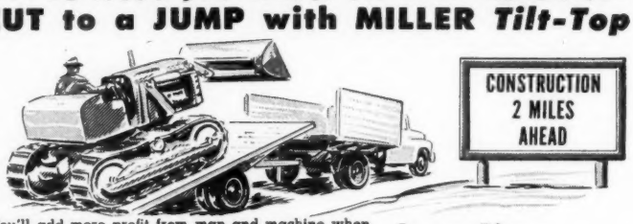
PLUMBING FIXTURES • HEATING EQUIPMENT • ELECTRIC PLANTS
AIR-COOLED ENGINES • PRECISION CONTROLS

. . . between-job travel for slow machines CUT to a JUMP with MILLER *Tilt-Top*



You'll add more profit from man and machine when you cut job-to-job time losses. Heavy, slow moving equipment is loaded on a MILLER Tilt-Top in less than two minutes. Operator drives unit on platform —it tilts, locks . . . and he's on his way with no lost motion. With a MILLER Tilt-Top, you get extra production on every job.

handier
easy-to-back
priced right

MILLER Tilt-Top saves even more time than other more cumbersome trailers with its better maneuverability, and easier backing. Best of all, MILLER'S exclusive mass production of Tilt-Top trailers cuts original cost for you. Get this extra help . . . extra production now — see your MILLER dealer today!

Model "B" 10 ton $1175*
Optional equipment (priced extra) 16' long platform (8'x14' standard), hydraulic tilt control, 2 speed hand winch and electric brakes.

**Plus freight and Federal Tax.*

MILLER Tilt-Top TRAILERS research engineers

Trade mark reg. Dept. C-12, 456 So. 92nd Street, Milwaukee 14, Wis.

gates with their Cedarapids overseas-type crushers. Asphalt is then added to the material at the Barber-Greene asphalt plant. The finished mixes are hauled out to the job and laid by a conventional Barber-Greene finisher.

Thus far, the excellent subbase material under the airfield favors heavy wheel loads. Joint pouring is about the only routine maintenance job on concrete. There has been some minor scaling and blast damage, but the shallow holes are promptly filled with fine concrete.

Building Maintenance

Pavement maintenance isn't the problem building maintenance is. Sudden temperature drops of 30 to 50 degrees are commonplace around Elmendorf. The freeze-ups in water pipes and utilities lines are always a worse problem than pavement maintenance.

Like any airport maintenance engineer in the arctic, Col. Pastor, with the aid of his crews, is proving that strategic air bases can be built and maintained even in the worst winter climates, and planes can be made to operate as dependably in Alaska as in Alabama or anywhere else in the United States. THE END

Booklet on Line of Pumps

■ The line of pumps manufactured by the Novo Engine Co., 702 Porter St., Lansing 5, Mich., are shown in literature from the company. Four types of pumps are dealt with including self-priming, centrifugal, diaphragm, wellpoint, and pressure types.

The pumps are described and their particular advantages and limitations are outlined. A pump-selection table has been included to serve as a guide in choosing the type of pump to be used for a given job. A table of useful engineering information and necessary friction tables are included in the manual along with a pump-trouble checklist and operating suggestions.

The company also offers literature on hoists which are available in heavy, medium, and light-duty models with single or double drums.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 427.

It is reported that fuels constitute more than 60 per cent of the value of the total mineral output of the world, 75 per cent in the United States.

Movie Available From B-E

A 16mm sound film in color is available from the publicity department of the Bucyrus-Erie Co., South Milwaukee, Wis., manufacturer of earth-moving equipment. "Digging for Your Future" shows how the company's products are conceived, designed, built, tested, and used in the field.

About 75 per cent of the 30-minute film is devoted to in-plant views of three of B-E's plants. The remaining footage shows on-the-job views of some of the firm's excavators, cranes, tractor equipment, and drills.

Prints of the film are available on loan without charge. For further information, write the company for the descriptive pamphlet.

Remember, Safety Is No Accident!

The Model TPM prime mover, an experimental Euclid rubber-tire bulldozer, is powered by a 300-hp engine. It is an all-wheel-steer, all-wheel-drive tractor mounted on 24:00 x 25 tires. The unit weighs 48,000 pounds. The manufacturer reports that working under extremely wet conditions, the Model TPM loads various makes of scrapers in less time than usually needed. For further information write to the Euclid Road Machinery Co., 1361 Chardon Road, Cleveland, 17, Ohio.

LOOK JOE! SAW SMOOTH — STRAIGHT OPENINGS
for PATCHES & TRENCHES with a . . . Clipper CONSAW
SAVE TIME — MATERIAL — MONEY by "SAWING BEFORE BREAKING" with a . . .®

MODEL C-130 ONE OF 5 MODELS, GAS OR ELECTRIC POWERED

Save up to 50% in labor and material. Saw repair patches — water, gas, sewer and air line trenches in floors, streets, walks and highways. Save too, by sawing contraction joints in floors and highways . . . eliminate costly hand forming and spalling.

"4 OUT OF 5" BUY CLIPPER CONCRETE SAWS. Three-Point Suspension (see below) . . . the Patented Water Application which increases blade life and speed . . . perfect balance and dashboard controls for operating ease and maneuverability — these are the reasons WHY — "4 OUT OF 5" Buy Clipper!

Only minimum replacement material needed and is poured to straight, smooth edges.

Joe! Stop excessive breakout and high cost

Sawed lines confine breakout fracturing and speeds removal up to 50%

Joe! Stop radial fracturing and excessive costs

Contraction joints in floors or streets eliminates spalling, 50% less seal and are maintenance-free.

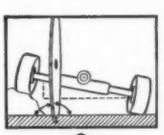
Joe! End slow, costly hand forming, spalling

NEARLY 20 YEARS EXPERIENCE
Sawing Concrete of All Types

The unqualified Clipper guarantee of satisfaction is backed by world-wide experience, the ability to select the finest materials and the "know-how" to put them together.

YOU CAN DEPEND ON CLIPPER SUPERIOR DIAMOND BLADES

. . . guaranteed to . . . "Provide the fastest cut . . . at the lowest cost." Clipper alone can supply every necessary metal bond . . . in over 36 specifications.



THREE POINT "No-Bind" SUSPENSION

Three Point Suspension holds the blade straight and true in the cut — **eliminates** binding — drifting — sidewear and friction. Guarantees the **longest possible** blade life!

CLIPPER MASONRY SAW

. . . the ONLY saw in the world that will cut masonry materials of every size and description. Clipper outperforms them all for ONLY Clipper is "CONVERTIBLE" and has the Patented Features for **flexibility.** A Clipper Model to fit any job — any budget. Sold on FREE TRIAL . . . Priced from $265.

MODEL HD 15 MODELS PRICED FROM $265

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ORDER TODAY . . . on FREE TRIAL. Discover for yourself how Clipper will increase your profits by increasing your production at reduced costs. Clipper "ON THE JOB" FREE TRIAL guarantees satisfaction at no *obligation.*

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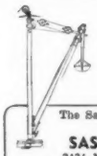
New Electric-Powered CHAMPION
DERRICK

Boom only can be supplied for use with old-style Mast and bottom

Single line cap. 300# @ 100 feet per minute.

Double line cap. 600# @ 50 feet per minute



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The Sasgen line is handled by leading equipment distributors everywhere.
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Convention Calendar

December 10-11 National Conference on Highway Financing

National Conference on Highway Financing, Shoreham Hotel, Washington, D.C. Harold Hammond, Chamber of Commerce of the United States, Washington 6, D. C.

December 14 Bituminous Concrete Producers

Ninth Annual Convention of Bituminous Concrete Producers Association, Waldorf Astoria Hotel, New York City. Gus Rayner, executive secretary, Box 667, Albany, N. Y.

January 5-7, 1954 Northeastern Weed Control Conference

Northeastern Weed Control Conference, Hotel New Yorker, New York, N.Y. Walter C. Jacob, secretary-treasurer, Department of Vegetable Crops, Cornell University, Ithaca, N. Y.

January 5-7 American Road Builders' Assn.

Meeting, American Road Builders' Association, Hotel Chalfonte-Haddon Hall, Atlantic City, N.J. Norman T. Almquist, administrative services manager, World Center Bldg., Washington 6, D.C.

January 12-14 National Constructors

Annual Meeting, National Constructors' Association, Hotel Commodore, New York, N.Y. C. B. Bronson, secretary-treasurer, 50 E. 41st St., New York, N.Y.

January 12-15 Highway Research Board

Annual Meeting, Highway Research Board, Academy of Sciences, Washington, D. C. Fred Burggraf, director, 2101 Constitution Ave., Washington 25, D. C.

January 12-15 American Society of Photogrammetry

Semi-annual Meeting, American Society of Photogrammetry, Shoreham Hotel, Washington, D. C. C. Earl Palmer, secretary-treasurer, American Society of Photogrammetry, 1000 11th St., Washington 1, D. C.

January 31-February 4 Associated Equipment Distributors

Thirty-fifth Annual Meeting, Associated Equipment Distributors, Waldorf-Astoria Hotel, New York, N.Y. P. D. Hermann, executive secretary, 30 E. Cedar St., Chicago, Ill.

February 1-3 Assn. of Asphalt Paving Technologists

Annual Meeting and Technical Sessions, Association of Asphalt Paving Technologists, Kentucky Hotel, Louisville, Ky. Ward K. Parr, secretary-treasurer, Box 376, Ann Arbor, Mich.

February 1-5 American Society for Testing Materials

Spring Meeting, American Society for Testing Materials, Shoreham Hotel, Washington, D.C. G. A. Wilson, ASTM, 1916 Race St., Philadelphia, Pa.

February 15-19 National Ready Mixed Concrete Assn. and National Sand and Gravel Assn.

Twenty-fourth Annual Convention of NRMCA and the thirty-eighth Annual Convention of National Sand and Gravel Assn., Conrad Hilton Hotel, Chicago, Ill. Vincent P. Ahearn, executive secertary, 1325 E Street, N.W., Washington, D. C.

February 25-27 American Concrete Pipe Assn.

Forty-sixth Annual Convention and Meeting, American Concrete Pipe Association, Fairmont Hotel, San Francisco, Calif. Howard F. Peckworth, managing director, 228 N. LaSalle St., Chicago, Ill.

ACI Directory Available

The American Concrete Institute has recently published its directory for 1953. The book lists past and present officers of the institute, the board of directors, members, and honorary members. Sections also deal with the work of committees, awards, bylaws, charter, and current affairs. The biennial directory may be obtained by writing to the American Concrete Institute, 18263 W. McNichols Road, Detroit 19, Mich. The price is $5.00 for nonmembers and $1.50 for extra copies to members.

Oklahoma Highway Dept. Trims Paving Expenses

Faced with a two-year budget far short of what was anticipated from the legislature, the Oklahoma State Highway Department is tightening its belt by cutting expenses in new paving construction. On future work in towns and cities, the state will not pay for such extras as curbs and guttering or widening, new sewer and water lines, or the adjustment of old ones.

The move represents a reversal of long-standing policy. Work of this type will be included in the contract if local authorities provide the finances or materials. Urban projects will be exempt, as will be projects on which plans and designs have already been completed.

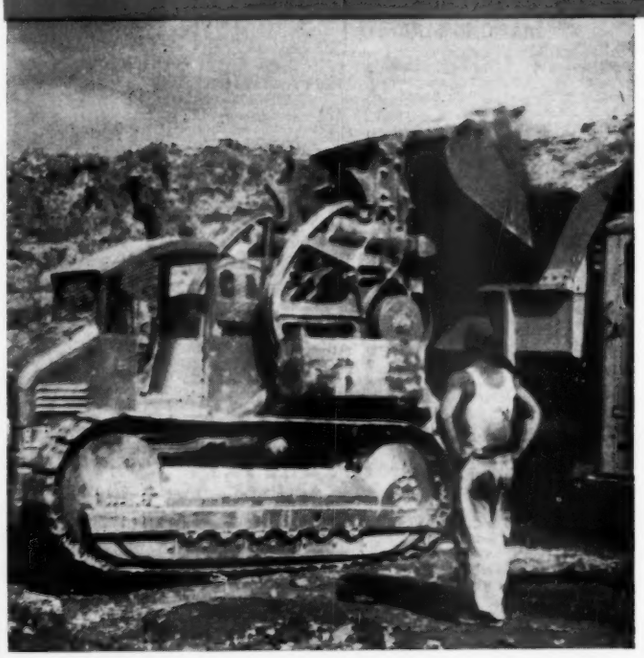
The change means that future highway improvements will be designed only for the normal width of the roadway.

Thor Appoints MacDonald

John L. MacDonald, former industrial tool service engineer, for the Boston district, has been named manager of the newly opened Newark, N. J., branch of the Thor Power Tool Co., Aurora, Ill. Mr. MacDonald has been with Thor since 1947.

The office, which was opened in July at 1 Tichenor Lane, is fully equipped with a repair service and stock of parts and accessories.

The 105 at work excavating semiconsolidated material. The machine shown here is on a contract job and is equipped with a 1½ cubic yard bucket equipped with long digging lip and teeth. The extra heavy design of this unit provides the necessary strength to use the machine for actual excavation work. Speed in loading is governed by the travel distance to the truck. With trucks in close the Eimco 105 can easily load at the rate of 6 to 8 yards per minute. Below—The operator sits up front in the 105 where he can get the best view of the work. Discharge of the bucket is controlled by the operator through the Eimco two speed bucket transmission.



Yes! The Eimco 105 is the world's finest tractor excavator! This is the first unit ever designed and built from the ground up with the purpose of performing as a base for heavy-duty attachments to its own frame so that it could be used efficiently for handling many jobs in addition to hauling around other equipment. The 105 is designed for heavy shock vertical loads as well as normal loads imposed through straight drawbar pull.

The Eimco 105 operates freely under all loading conditions, will dig, excavate or bulldoze on even or uneven ground because of its full oscillating track feature even with the bucket attachment.

Bar Benders and Cutters

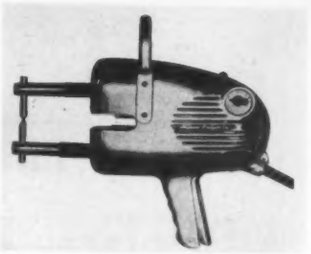
■ A catalog on metalworking machinery includes sections on hand-lever bar cutters and bar and angle-iron benders. The booklet illustrates the Samson and the Lewthwaite bar cutters in various models that handle rods, angles, flat bars, and wire rope in a wide range of sizes. Also shown are Marvel rod cutters that will take only round bars, rods, and wire. These are recommended for cutting ends that must be free from distortion.

Also illustrated are the JK bar benders that can be furnished with jaws of various heights. For these units, U forms can be supplied for radius bends up to 180 degrees, and standard equipment includes a stop gage for duplicate bends. Also cataloged are the Samson and the Whitney angle-iron benders.

To obtain this literature write to Julius Blum & Co., Inc., Carlstadt, N. J., or use the Request Card at page 18. Circle No. 381.

Portable Spot Welder

■ A portable spot welder that features an electronic timing control mechanism enclosed within the unit itself is announced by the Ampower Products Co., 5737 W. 87th St., Oak Lawn, Ill. The control offers a timing cycle from 1/60 of a second to a full second. The unit welds most alloys of aluminum sheet and steel, including mild and stainless as well as galvanized and cadmium-plated. Its output is over 10 kva.



The Ampower spot welder.

The welder weighs 26 pounds and has a pistol grip for easy handling and manipulation. A special stand converts it into a foot-operated floor model.

For further information write to the company, or use the Request Card at page 18. Circle No. 397.

Data on Diesel Engines, Power Plants, and Pumps

■ Diesel engines, centrifugal water-pumps, and electric plants are described in a catalog from the Hallett Mfg. Co., 1601 W. Florence Ave., Inglewood, Calif. The smallest of the full diesels offered is the Model AC-1, a 220-pound air-cooled unit that delivers 5.5 hp at 1,800 rpm. The Model D1-A, a water-cooled diesel, is rated at 8 hp at 1,500 rpm. The company's largest water-cooled diesel unit is the 2-cylinder Model D-2 with a capacity of 18 hp at 1,500 rpm.

Pumping units built around adaptations of these diesels are available in a wide range of capacities. The diesel centrifugal pumps are available in close-coupled models with clutch, direct-coupled units, and belt-connected models.

The booklet also describes the line of diesel-electric generating sets made in 1 and 2-cylinder models to produce 2½ to 10 kilowatts. All sizes are available in both belt-driven and quill-mounted units.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 411.

Line of Tractor Loaders And Blade Attachments

■ A variety of attachments for the Ford tractor is illustrated in literature from the Ford Tractor Division, Ford Motor Co., 2500 E. Maple Road, Birmingham, Mich. Featured in the booklet is the Dearborn industrial loader that can lift 1,000 pounds of material and dump it up to 10 feet 8 inches from the ground. The 9-cubic-foot-capacity bucket is powered by a hydraulic pump mounted on the tractor. Other front-end loaders illustrated lift 750 and 1,000 pounds to a height of 7½ feet.

Included in the line of attachments is a 7-cubic-foot scoop for sand, gravel, and dirt; front and rear-mounted cranes; a post hole digger; and a subsoiler that will penetrate to a depth of 18 inches to loosen clay, dirt, or gravel. A line of front and rear-mounted blades is also shown.

To obtain this literature write to the company, or use the Request Card that is bound in at page 18. Circle No. 380.

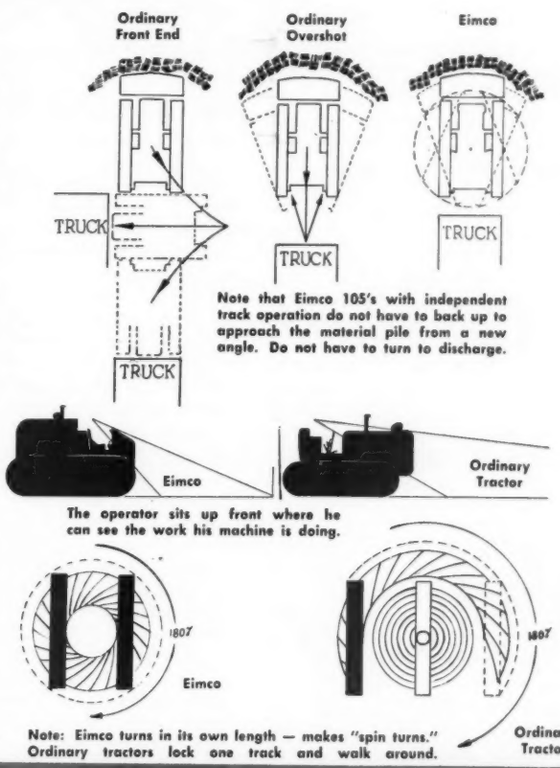
ITH COST SAVING ADVANTAGES

SAVES TIME: Simple, conveniently located handles held in one hand control all movements. Push for forward — pull for reverse — twist for spin turns. This easy control simplifies the operator's work — eliminates turning to dump — eliminates foot clutches and hand shifting and pull brakes — keeps the trucks up close and speeds up the loading cycle.

GREATER DEPENDABILITY: Simple, strong construction of the great new Eimco transmission provides greater dependability. This compact unit contains all of the gearing and clutches for speed changing and full independent reversal of each track. Every moving part is pressure lubricated. The oil-cooled, positive engagement clutches never need adjustment.

BETTER VISABILITY: The operator in the Eimco 105 sits up front where he can see the work that's being done.

GREATER FLEXIBILITY: The 105 covers the upper bracket range of work done by several models of ordinary tractor equipment in several different price and weight brackets. With the 105 priced with the lower of this group, yet powerful enough to do many of the jobs for which the larger, more expensive, units are employed.


Ordinary Front End
Ordinary Overshot
Eimco
TRUCK
TRUCK
TRUCK
Note that Eimco 105's with independent track operation do not have to back up to approach the material pile from a new angle. Do not have to turn to discharge.
Eimco
Ordinary Tractor
The operator sits up front where he can see the work his machine is doing.
180°
Eimco
180°
Ordinary Tractor
Note: Eimco turns in its own length — makes "spin turns." Ordinary tractors lock one track and walk around.

THE EIMCO CORPORATION
Salt Lake City, Utah, U.S.A.
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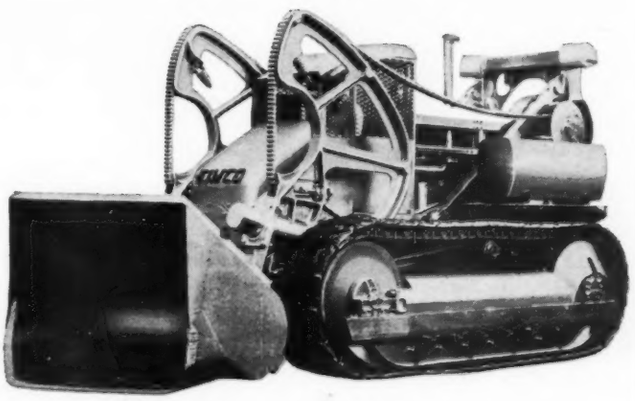
STRONGER CONSTRUCTION THROUGHOUT: The 105 is made of steel — not cast iron. There is quite a difference in these two construction materials. Cast alloy steel as used in the 105 is not subject to shock cracks even under severe operating conditions. Steel stands strains and stresses imposed by heavy loads without danger of failure. The Eimco 105 is the only crawler unit made of steel and gives you a superior machine with longer dependable life and lower maintenance costs. This is the machine for your next heavy job. Let us send an Eimco engineer to tell you the facts.



The Eimco 105 — world's finest tractor-excavator

Heavy Fill Displaces Peat In Deep Swamps

Fischer Construction Co.'s Universal crushing plant which supplied material for the subbase and base course. *C. & E. Photo*

Road fill is built up above grade to overload peat and force it out at sides in Minnesota highway job

BUILDING A NEW grade across peat swamps up to 30 feet deep was the major problem in the reconstruction of U. S. 61 between Red Wing and Lake City, Minn. And keeping the road open to traffic was almost as much of a problem. Despite these obstacles, A. L. Alley & Son, Faribault, Minn., completed the work in the 175 working days allowed by the contract.

The 13.2-mile section included in the contract lies in the beautiful Hiawatha Valley of the Mississippi River where it widens to become Lake Pepin. The highway follows the base of the high bluffs which line the river valley and parallel the tracks of the Milwaukee Railroad's Chicago to St. Paul-Minneapolis line.

A sizable area lying to the west of the river is drained into the Mississippi through a series of watercourses which cross this route. Since many of these watersheds are steep, and heavy rainfalls are frequent, flash floods very often rush down from the bluffs and often damage or block the old highway.

Not only was the old highway subject to flooding from streams, but it was also inundated a number of times in recent years by high water in Lake Pepin. The road's relatively sharp turns and limited sight distances have been additional traffic hazards.

The new road, with improved alignment, larger culverts and bridges, and a higher grade line in critical sections, will not be subject to the floods and will provide greater safety to travelers.

Selecting an entirely new alignment in this case was out of the question because of the limited area between the river and the high bluffs. The new alignment, therefore, utilizes some of the old right-of-way with necessary widening and some entirely new right-of-way where space permitted.

Carry Traffic Through Job

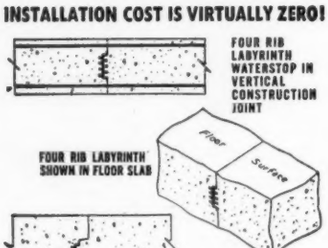
Since it was practically impossible to detour traffic, the contractor had to do the grading bit by bit, keeping the old road open until he could complete sections of the new grade.

just nail 'em in... pour your concrete

AND FORGET ABOUT SEEPAGE WITH LABYRINTH WATERSTOPS

• Concrete shrinkage *can't* cause leakage between pours when you're protected by ribbed and grooved polyvinyl plastic Labyrinth Waterstops in the joints. Economical? You bet . . . No special forms, no metal fins to bend or tear . . . no maintenance cost, AND . . .

INSTALLATION COST IS VIRTUALLY ZERO!



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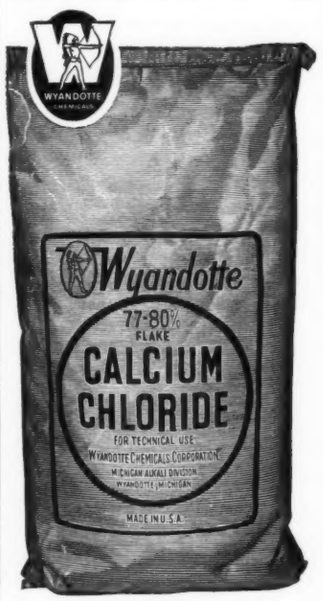

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Melts ice at temperatures as low as –59° F. Makes abrasives go three times as far. Keeps abrasive stockpiles workable.

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- Produces stronger, faster-setting concrete
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- Prevents coal freezing

Wyandotte CHEMICALS

WYANDOTTE CHEMICALS CORPORATION
WYANDOTTE, MICHIGAN

A Caterpillar D8, with a LeTourneau scraper and D8 pusher, takes a cut in a rocky side hill section. Telephone poles complicated the earth-moving. *C. & E. Photo*

A Caterpillar DW21 is push-loaded by two Allis-Chalmers HD20 tractors in the largest borrow pit. Tractors have push blocks enabling either one to push the other. *C. & E. Photo*

This greatly increased operational hazards, since it was necessary for the earth-moving equipment to cross the heavily traveled roadway during many operations.

In spite of numerous warning signs and the obvious risk of driving through the grading operations, motorists continued to drive at dangerous speeds, making it necessary to use flagmen at every crossing to get the equipment through safely.

The most interesting feature of the project was the filling of several swamps in which the peat was as much as 30 feet deep with water practically at the surface. Two Lima Paymaster draglines started the excavation. Working from mats on the peat, they removed 10 to 14 feet of the top material and cast it to the side. But even at these depths, the peat flowed back into the excavation from all sides, and it was obvious that trying to dig deeper was futile.

A fleet of scrapers, following the two Limas as closely as possible, filled the excavation with granular material from nearby borrow pits. As the fill progressed, the liquid mass of peat and water from below was forced to the surface. A third dragline, located on the extreme end of the new fill, dragged out and cast aside the material which boiled up so it would not be trapped in the fill.

The fill was started along the center line of the road and was built up above grade to overload the peat which remained below. The peat was then forced up and out to the sides. The draglines returned and dug trenches as deep as possible alongside the embankment, casting the peat as far back as possible.

When the center line was stabilized to a reasonable degree, more material was added and dozed to the sides to widen the fill gradually to full section. While this was being done, the draglines continuously removed the excess peat which was forced out to the sides.

On one of the swamp crossings, the road parallels the railroad across soft peat. The contractor realized that any unusual loading on the peat adjacent to the railroad might result in displacement of the railroad fill with consequent damage to the tracks. With passenger and freight trains running past at frequent intervals and at relatively high speeds, the situation demanded special care.

Buffer Trench Dug

A buffer trench, 15 feet wide and 10 feet deep, was dug between the highway and the railroad prior to placing the fill. When the fill was loaded, this trench closed up completely and additional excavation was necessary to protect the railroad. During this period, a constant watch was maintained at the railroad to detect any sign of movement.

During the swamp excavations, the draglines worked around the clock. Each Lima was equipped with a 2,500-watt Homelite electric plant to supply light for night operation. Additional light for other operations was supplied by two Kohler 5,000-watt generators mounted on an old truck chassis. Lights attached to standards on the truck could be adjusted to apply the illumination where needed.

In order to determine when the granular fill had penetrated to solid bottom and driven out all the peat, soundings were taken continuously through the roadbed and as far to the sides as the slopes of the fill extended. These soundings showed that only a small amount of peat was trapped in the fill and that the granular material penetrated to solid bottom.

Cross-sections plotted from these soundings showed that the fill took the shape of a flattened circle. Width at subgrade level was 80 feet. Going down from this elevation, the slopes carried out at about 2 to 1 and were rounded in near the bottom of the swamp.

Fills were overloaded in varying amounts, depending on the depth of peat to be forced out from below. Minimum overload was 2 feet with the maximum near 10 feet. The material used for fill was a bank-run sandy gravel from borrow pits located along the right-of-way.

Use Rubber-Tired Equipment

Filling these swamps, as well as raising the grade in low areas, required the borrowing of more than 350,000 cubic yards of granular fill. While good material was available in seven pits along the project, the hauls still averaged 2,800 to 3,000 feet. with some ranging to well over a mile.

Most of this material, as well as much of the other excavation on the project, was moved by a fleet of five new Caterpillar DW21 rubber-tired scrapers. The DW21's were loaded and dumped with exceptional speed and seemed to get through soft and sandy spots in the haul roads with a minimum of delay.

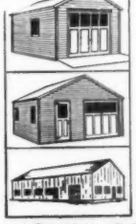
In the borrow pits, Alley used two Allis-Chalmers HD20 tractors in tandem to push-load the scrapers. Both of the tractors were equipped with push plates on the front and push blocks on the rear. Either tractor could push the scraper, with the other tractor pushing against the push block on the rear of the first tractor.

This method provided an absolute minimum of delay since no hook-up was required and the scraper was free to speed away as soon as it was loaded. The flexibility of the HD20, with its torque-converter drive, applied a maximum of pushing power while following the rubber-tired scrapers without requiring a change of gears.

Heaping loads were picked up by the 18-yard scrapers in as little as 40 seconds. Another HD20 on the dump speeded the unloading opera-

(Continued on next page)

Cooper-Built



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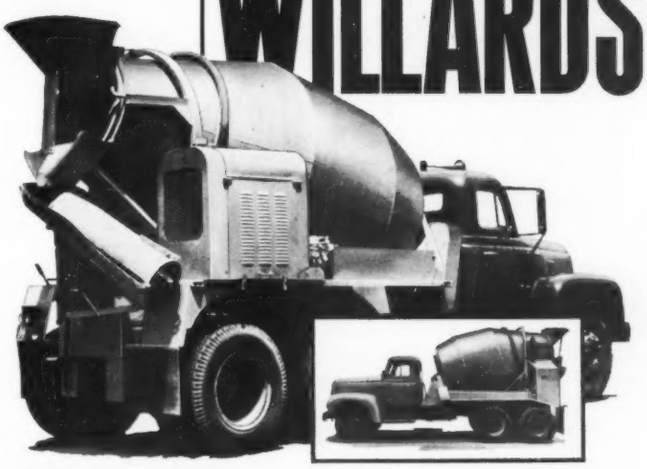

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Fill Displaces Peat In Deep Swamps

(*Continued from preceding page*)

tion, enabling the scrapers to make complete round trips on hauls up to 2,500 feet in seven to ten minutes.

Other hauling equipment on the project included two Tournapulls and two Caterpillar D8 tractors with LeTourneau scrapers. Three other D8 tractors were used for pushing, dozing, and pulling the Bros double-drum sheepfoot tampers. Including the borrow material, this equipment moved more than 1,200,000 cubic yards of material on the project.

More than 50,000 square yards of the old concrete pavement was broken up and most of it was used for riprap along Lake Pepin. The old 9:7:9-inch pavement was broken up by a 2,000-pound breaker ball handled by a Schield Bantam truck crane. The broken material was loaded by an Allis-Chalmers HD9 tractor, equipped with a 2-yard Shoveloader, into Chevrolet dump trucks.

A sand-rock cut, consisting of approximately 4,000 cubic yards of solid rock, was encountered. Alley removed the softer portions of the rock by ripping with a Caterpillar 28 ripper, pushed and pulled by two Caterpillar D8 tractors. The material was then loaded into the LeTourneau scrapers pulled by D8's.

Rock which resisted this treatment was drilled with hand drills powered by a Chicago Pneumatic 105 compressor and shot with small charges of Hercules 60 per cent dynamite.

Lubrication and Repair

On a site adjacent to the largest borrow pit on the job, Alley set up a 28 x 60-foot Armco steel building for a repair shop. Equipped with an overhead movable crane and chain hoist for lifting heavy parts, an air compressor, welding equipment, heat for winter comfort, and a supply of tools and parts, this building was used for maintaining and overhauling equipment throughout the work. As many as six mechanics were at work overhauling the machines during the winter while the project was closed down.

Daily lubrication and servicing were handled by two greasers using a mobile Alemite lubricating system. All lubricants were dispensed directly from their original bulk containers, minimizing introduction of dirt or contamination. Greasers serviced the machines during lunch stops and after regular working hours.

Final compaction of the stabilized base is accomplished by a Tampo 13-wheel rubber-tired roller pulled by an International M tractor at left and a Flatiron roller pulled by a similar tractor at right. *C. & E. Photo*

Construct Stabilized Base

In addition to the grading, the contract included the furnishing and placing of a 12-inch subbase and six inches of stabilized gravel base. This portion of the work was sublet to Fischer Construction Co., Farmington, Minn., which produced and placed approximately 200,000 tons of subbase and more than 100,000 tons of base.

Both materials were obtained from pits adjacent to the project. The subbase material was a typical bank run with only the larger stone removed or crushed. All of the subbase was required to pass the 3-inch screen, with 35 to 100 per cent passing the number 4, and 0 to 10 per cent passing the 200-mesh screen.

Material for the stabilized base was much more carefully graded. A typical grading was:

Screen	Per Cent Passing
1 inch	100
¾ inch	90–100
⅜ inch	50–80
No. 4	35–65
No. 10	25–50
No. 40	8–25
No. 200	3–10

Plasticity index of the minus 200 material in both specifications is limited to a maximum of six.

Crushing and Screening Gravel

Fischer set up its No. 880 Universal senior crushing plant in a pit near Frontenac, Minn., at about the mid-point of the project. The crushing plant was equipped with a double-deck 4 x 12-foot Simplicity vibrating screen and was driven by a 6-cylinder GM diesel engine.

When the pit was stripped, that part of the stripping suitable for use as binder soil was stockpiled nearby. This material was then fed into the plant on a separate conveyor from a hopper. The material was handled from stockpile to hop-

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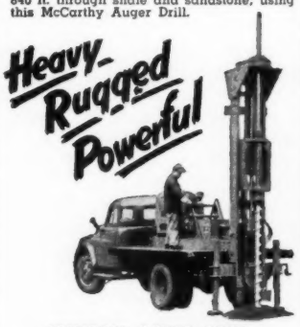

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Operating men who have made actual on-the-job tests find the McCarthy Vertical Auger Drill a standout for mobility, stamina, ruggedness and versatility. On a 2-million dollar, 5-mile stretch of superhighway between Hubbard, Ohio, and Sharon, Pa., The Apex Powder Co., Canton, Ohio, cut blasting costs approximately 20% as compared to air, well or churn drilling. Cutting through two large areas of concentrated rock, 150 holes 15 feet deep were bored for each blasting pattern. 3,000 cubic yards of sand rock were moved at each blast. Due to the ruggedness and mobility of McCarthy Drills, there was no time lost. For further information, write Salem Tool Co. and our distributor will contact you.

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per by an Allis-Chalmers HD-5 equipped with a Tracto-Shovel.

An Allis-Chalmers HD-15 tractor with a Gar Wood cable-dozer fed gravel from the pit to a trap, and from there a belt conveyor carried it to the primary crusher. Crushed and blended material was deposited in waiting trucks by a belt conveyor which carried it from the other end of the plant.

A Thurman 20-ton truck scale was mounted so that the trucks stood on the scale while being loaded. Most of the material was hauled to the road in International L-190 tandem dump trucks carrying 11 tons to the load. The setup produced approximately 225 tons per hour of the one-inch stabilized base material.

Compaction of this base material to at least 98 per cent Proctor density, or 140 pounds per cubic foot, was required by the specifications. Fischer obtained this density by spreading the material in thin layers with two motor graders, a Caterpillar Model 12 and an Allis-Chalmers AD-40, and then watering and rolling. Compacting was done by three rubber-tire rollers. Two of these were Flatiron rollers having five wheels fitted with 20.00 x 18 tires, and loaded to weigh a total of 8 tons. The other was a 13-wheel Tampo roller. International WD-9 and M tractors pulled the rollers.

This section of highway is scheduled for paving in the near future, but a temporary bituminous surface was applied under the contract. A mixed prime plus 1¼ inches of road-mixed surfacing was applied as temporary wearing course; 12,500 tons of aggregate and 280,000 gallons of cutback went into the mat.

Bridges and Culverts

One bridge and six box culverts were constructed by the grading contractor, who also installed many pipe culverts. The three-span bridge carries the highway over one of the larger creeks near Lake City. The reinforced-concrete structure has three 38-foot spans, a 30-foot roadway, and 35-foot over-all width.

Forms for the concrete were constructed on the site. Plyform was used, and some of the forms were lined with Masonite. Ready-mixed concrete was placed in the forms by the Schield Bantam and Lima cranes using ½-yard and 1-yard bottom-dump buckets.

Footings for the bridge piers and abutments consisted of 40-foot wood piles, driven into the silty subgrade material with a 2,300-pound drop hammer handled by the Lima Paymaster crane.

Quantities and Personnel

The complete set of plans for the project contained 183 plan sheets in addition to the specifications. A summary of some of the major items of the contract includes the following quantities:

Length of project	13.2 miles
Excavation	1,200,000 cu. yds.
Subbase	200,000 tons
Stabilized base	101,000 tons
Sodding	11,815 sq. yds.
Seeding	158 acres

Project superintendent for A. L. Alley & Son was Lloyd M. Parker. Supervising the production and placing of base materials for Fischer Construction Co. was Ernie Pilger. Project engineer for the Minnesota Department of Highways was Paul A. Levorsen. District engineer for the sixth district is Clayton Swanson. M. J. Hoffman is commissioner of highways and O. L. Kipp is chief engineer. THE END

Flexonics Names Salesmen

Howard W. Griesbach and Richard H. Sabel have been made assistant sales manager of the Bellows division and sales development manager, respectively, for Flexonics Corp., Maywood, Ill., manufacturer of flexible metal hose, expansion joints, and metallic bellows.

NFPA Studies Comments On Safety Revisions

The Committee of Piers and Wharves of the National Fire Protection Association, 60 Batterymarch St., Boston 10, Mass., is currently studying comments and suggestions on its proposed revisions to the fire safety standards for the construction and protection of piers and wharves.

Copies of the completely revised standards were made available to interested persons last November for their comments and criticisms. The committee is currently preparing a final text which it will submit for official adoption by the NFPA at its annual meeting in Washington, D. C., this spring.

The original standards were adopted in 1925, following a six-year study by the NFPA in cooperation with the American Association of Port Authorities and other representative organizations of engineering, terminal, marine, railroad, and insurance interests. Revised editions were subsequently adopted in 1931 and 1935.

Mangan Remains at Buda

Ralph K. Mangan will continue to be in charge of The Buda Co., Harvey, Ill., a recently acquired division of the Allis-Chalmers Mfg. Co., Milwaukee 1, Wis. The organization manufactures gasoline and diesel engines, generating sets, and power units for the construction industry.

Mr. Mangan, who has been with Buda for 36 years, has been president since 1950. His new title will be that of president and general manager.

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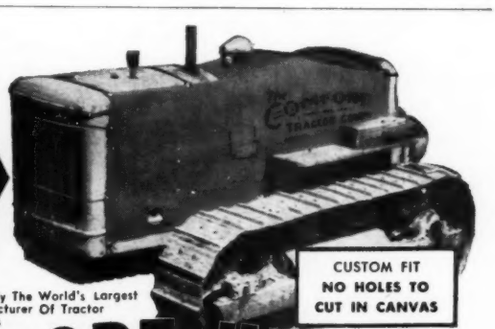

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Thruway Calculators Will Prevent Delays

MOTORIST and truck-driver alike will encounter a minimum of delay when entering or leaving the New York State Thruway, thanks to a simple but accurate and versatile toll collection system developed by Remington Rand, Inc., New York City, and Taller & Cooper, Inc., Brooklyn, N. Y.

In general, the system will resemble existing setups, such as the one used on the New Jersey Turnpike. The transit or trip ticket is to be a punched card which will carry information supplied at entrance and exit toll booths and which will be processed at division and central offices for audit purposes. The card is also designed to provide detailed traffic reports for the thruway as a whole and for any desired section.

The Buffalo-Albany-New York City superhighway is expected to be opened to traffic late next year. Contracts for their respective portions of the new toll collection system were awarded Remington Rand and Taller & Cooper last summer, thereby making possible progressive installation of equipment as more and more sections of the road are completed.

Thruway Users

From the administrative and revenue standpoint, Thruway users can be separated into three classes: passenger and commercial vehicles whose owners pay cash, commercial vehicles whose owners have charge accounts, and passenger vehicles whose owners pay an annual fee to use the superhighway. Charge accounts will have punched plastic plates as identification, while those drivers paying the annual fee will have windshield stickers and permits.

The bulk of the figures required for the daily traffic analyses will be automatically summarized while the day's toll tickets are undergoing their single pass through the tabulators at the toll booths, creating daily cash reconciliations and reports. At the end of the day, an electronic sorter will divide the trip tickets by class of vehicle. The cards will next be fed to a tabulator-summary punch combination which will reduce the 200,000 to 400,000 daily tickets into roughly 4,000 summary cards, which may then be processed in many different ways for specialized analyses at the convenience of the central office staff.

The daily analysis information will be accumulated at entry and exit interchange plazas while the toll employees are handling ticket distribution and fare collection. As a vehicle passes through the toll gate to enter the thruway, the collector will classify it and check for a permit sticker. He will then press one of several buttons on his issuing machine which will properly punch and eject a trip ticket. The machine will punch holes which signify the number of the entry interchange and the vehicle classification; it will also print on the ticket these two items plus the date and time, an issuing serial number, and the toll collector's identification number.

Safeguards Against Theft

As the vehicle leaves the toll lane, its wheels will run over a treadle that will record each passing axle by means of a pulse to a remote recording device inaccessible to the collector. A special camera has also been developed to supervise any lane at will. These safeguards are designed to detect small-scale pilfering by employees and/or motorists.

When the vehicle pulls into the exit interchange plaza, its driver will surrender his trip ticket, which will be inserted into perhaps the most complex machine in use along the thruway—the exit-interchange computer. Of immediate importance to cash customers is the tariff they must pay. This machine reads the punched holes to establish entry point and vehicle classification and selects the corresponding fare, which is shown in a window. The

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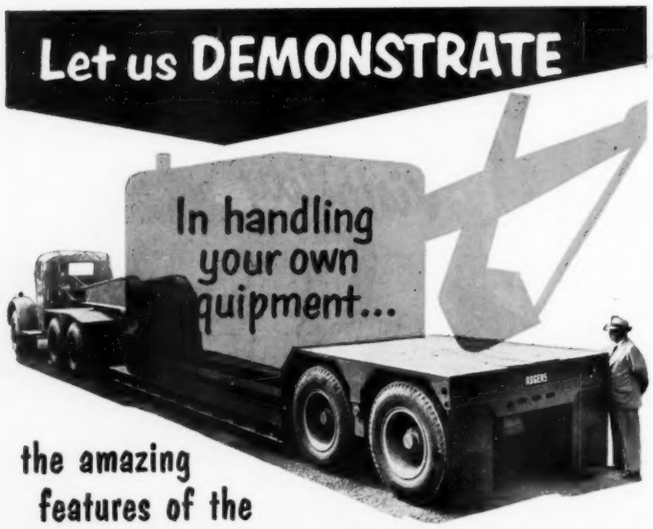

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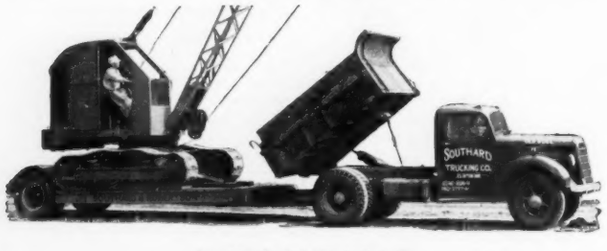

Attaching loaded tilt deck trailer

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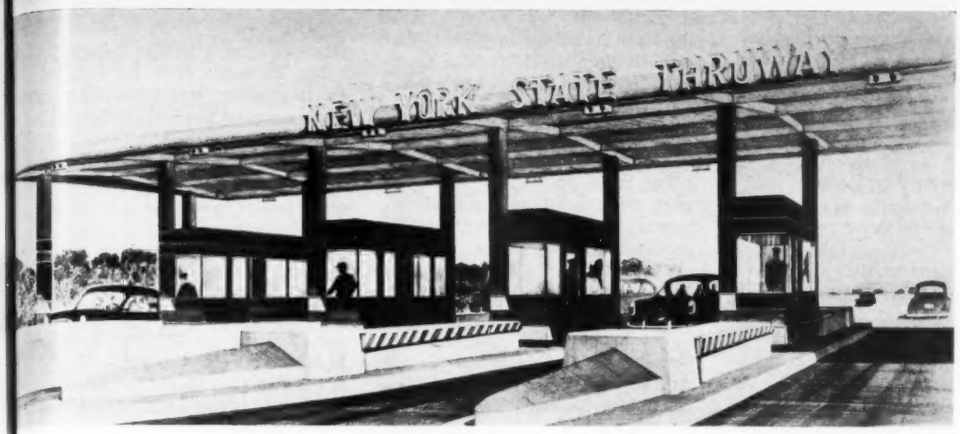

Artist's conception of a typical toll gate on the New York State Thruway. Remington Rand, Inc., New York City, and Taller & Cooper, Brooklyn, N. Y., hold the contracts for the toll collection system.

cash customer pays the amount and is on his way. Commercial vehicles are issued receipts automatically; passenger car operators must request them.

Cars displaying yearly permit stickers can move on as soon as their drivers surrender the trip ticket. The charge account driver must wait a few seconds while his plastic plate is inserted into the computer along with the trip ticket. The machine reads the vehicle identification number and charge account number punched in the plate and transfers the information into the ticket, also by means of punched holes. Then the driver gets his charge plate back and can move on.

Secondary Operations

In addition to satisfying these immediate needs, the computer adds one count to the axle counter. It also adds a count to the cash transaction, charge account, or annual permit counter—whichever applies to the particular vehicle being processed. It punches a validation hole to cancel the ticket and punches the interchange number. All this information, in addition to the date, time, and collector's number will also be stamped on the ticket. In the case of cash transactions, the toll is added to the cash totalizer and is stamped on the ticket. The tickets of yearly permit holders are punched to indicate the fact.

The holes in the charge trip tickets are valuated by a multi-control producer in the central office. This machine punches the exact fare and mileage on the ticket so that it may be run through the electronic sorter for distribution by account numbers, and then run through a tabulator to produce an itemized receipt. THE END

(From an article in *Systems* magazine, September, 1953, "High Speed Accounting for the New York State Thruway".)

Onan Describes Itself

■ D. W. Onan & Sons Inc., University Ave., S. E., at 25th, Minneapolis 14, Minn., has issued a brochure describing what goes into the making of the company's electric plants. The booklet takes the reader inside the engineering, experimental-research, tool and dye production and assembly, and testing departments where he may follow the manufacturing procedure. The emphasis is on product improvement through modern production techniques and constant testing.

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Avoid Legal Pitfalls

Edited by A. L. H. STREET, Attorney-at-Law

These brief extracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

Underground Structures—Liability of Excavator

THE PROBLEM: *A public utility's electric cables were encased in a concrete duct about 16 or 18 inches x 24 inches x 2 feet below a city alley surface. Building excavation upon abutting land had proceeded more than 10 feet when the duct caved into the excavation. The city building code required that provision be made to safeguard adjacent buildings and "structures". None was made. Was the duct a "structure" within the meaning of the code?*

THE ANSWER: Yes. (El Paso Electric Co. v. Safeway Stores, Inc., 257 S. W. 2d 502, decided by the Texas Court of Civil Appeals, El Paso.)

The court ordered rehearing of the case in the trial court after the trial judge had dismissed the suit as to the landowner, the general contractor, and the excavating subcontractor.

In deciding that the conduit was a "structure" within the meaning of the building code, the Court of Civil Appeals disregarded testimony of contractors and engineers as to meaning of "structures" as used in the construction industry. That could not affect the meaning of the code as interpreted by the courts in the light of apparent legislative intention. That intention seems to have been to obviate, as to excavations in El Paso, the common-law rule that an excavating owner is not bound to support the soil on adjacent land and not liable for its subsidence unless the excavating is negligently done. (But the opinion makes it clear that the common-law rule applies in Texas except as modified by state or municipal legislation.)

The court also decided that if negligence was a factor in the particular case, there was evidence in the case to have justified a jury that there was negligence. It was also for the jury to decide whether or not the public utility companies were guilty of contributory negligence in failing to notify the defendants of the presence of the duct.

Indemnity Insurance

THE PROBLEM: *A subcontractor for shoring and sheet-piling work secured liability insurance to protect himself against liability to the contractor for damage to property. The policy obligated the insurer to defend any suit against the subcontractor on account of such damage. A damage claim was made against the prime contractor, and he served demand upon the subcontractor for arbitration of the claim. The insurance company refused to participate in an arbitration proceeding, on the ground that its policy did not require it to defend only claims enforced by suit. Was the insurance company bound to defend, and was it liable for payment of an award made by the arbitrators against the subcontractor?*

THE ANSWER: No. (Madawick Contracting Co. v. Travelers Insurance Co., 118 N. Y. Supp. 2d 115, decided by the Appellate Division of the New York Supreme Court, Second Division; which decision modified a judgment rendered in a lower court (114 N. Y. Supp. 2d 300).

State Spex Did Not Apply

THE PROBLEM: *General spex covering work to be done by a subcontractor in surfacing a state bridge deck made no reference to standard state spex. Could the latter be regarded as part of the subcontract?*

THE ANSWER: No. (Berke Moore Co., Inc. v. Phoenix Bridge Co., 98 Atl. 2d 150, decided by the New Hampshire Supreme Court.)

Alternative Bidding

THE PROBLEM: *Bids were called on two sewer sections—"either a single proposal for both sections . . . or separate proposals". Three corresponding bid forms were provided. The base bidding plan for Section 1 contemplated subsidewalk construction, but alternative provision was made for laying the sewer under highway curbing. C bid $389,416.45 on Section 1, plus $1,445 for the alternate route, and $508,621.30 on Section 2, totaling $899,642.75, plus $1,445 for the alternate route. D bid $388,359.40, plus $30,000 for the alternate, and $445,985 on Section 2, and*

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HERE'S the Cedarapids Super Tandem Gravel Plant *newly engineered* for star performance on jobs where gradation of a big volume of material is the most important of the plant operations. The Super Tandem is now built with a 48" x 12' Horizontal Vibrating Screen to give you the really high screening capacity that is a big advantage in any pit and is especially profitable where there's a high percentage of fines or contaminated material. Other Super Tandem features, like the 1036 jaw crusher, 2416 roll crusher and 30" wide conveyors, are engineered to handle this extra capacity with no increase in operating or maintenance costs. See your Cedarapids distributor for complete details.

THE IOWA LINE *of Material Handling Equipment Includes:* ROCK AND GRAVEL CRUSHE
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also bid $827,945.25, plus $30,000 for the alternate. On opening the bids, the town board eliminated the alternative route and awarded the contract to D as being the lowest bidder. Was C entitled to a court order directing award of the contract to him?

THE ANSWER: No. (Cestone v. Evans, 121 N. Y. Supp. 2d, 80, decided by the New York Supreme Court, Appellate Division, Third Department.)

The board did not exceed its power in eliminating the alternate route; no bad faith or fraud being shown.

D's bid was not illegal even if the bidding specifications contemplated only two bids—one on each section, or one on both, whereas C offered three bids. D was the lowest base bidder on either section or both.

Engineers Were Not To Blame for Delay

THE PROBLEM: *Defendant accepted plaintiff engineering firm's proposal "to furnish engineering services, as required by you and as you may direct, in connection with the construction of your proposed slag handling plant". Did this contract require the defendant to inform the engineers of its specific needs from time to time, and allow sufficient time for completion of the engineering services within a reasonable time?*

THE ANSWER: Yes. (Giffels & Vallet, Inc., v. Edward V. Lefy Co., 58 N. W. 2d 899, decided by the Michigan Supreme Court.)

Plaintiff sued for compensation for services and defendant counterclaimed, unsuccessfully, on account of plaintiff's alleged delay in furnishing drawings.

Bayside Landowner Owned Land Formed by Dredging

THE PROBLEM: *In dredging a ship channel adjacent to a Mobile Bay shore, about 60 acres of land was formed in front of defendant's bayshore land. Did this artificial accretion belong to him or to the State of Alabama, which owned the bed of the bay from which the material was dredged?*

THE ANSWER: It belonged to defendant. (State v. Gill, 66 So. 2d 141, decided by the Alabama Supreme Court.)

The court said that the state's ownership of the bed did not include individual grains of sand or lumps of mud forming part of the bed after passing through the pipes of a hydraulic dredge and being deposited in such a way as to constitute an accretion to shore land.

Delay in Material Delivery Is Excused

THE PROBLEM: *A pilot canal construction contract bound the Government to furnish cement and material and limited the time for completing the job. On the facts stated, was the contractor entitled to damages for delay in delivery of the materials?*

THE ANSWER: No. (Barling v. United States, 111 Fed. Supp. 878, decided by the United States Court of Claims.)

The Government had promptly ordered the materials and delays in delivery were due to shortage of materials and fault of the manufacturers.

The Court of Claims further noted that the evidence failed to show that the Government had warranted to furnish the materials as needed; and that if a Government official, other than the contracting officer, had assured the contractor that the materials would be so furnished, the assurance was void for want of the official's authority to give it.

State Denied Offset As to Contract Debt

THE PROBLEM: *A New Jersey statute provides that public funds paid to a public contractor shall constitute a trust fund for the payment of charges incurred in performing the particular contract. Other statutes provide for financing veterans' and emergency housing projects. Could the State offset, against money due a housing contractor, a claim for unemployment and disability taxes unrelated to the particular project?*

THE ANSWER: No. (National Surety Corp. v. Barth, 95 Atl. 2d 145, decided by the New Jersey Supreme Court.)

The court said that the first-mentioned statute clearly did not impress a trust in favor of the contractor's creditors so long as it remained in the state's hands, but only after payment to the contractor; and that the housing statutes showed legislative intent that all funds received by the state for housing projects should be exclusively used on such projects. Therefore, there was no basis for setting off against a housing contractor a debt due him for taxes wholly unrelated to the particular contract.

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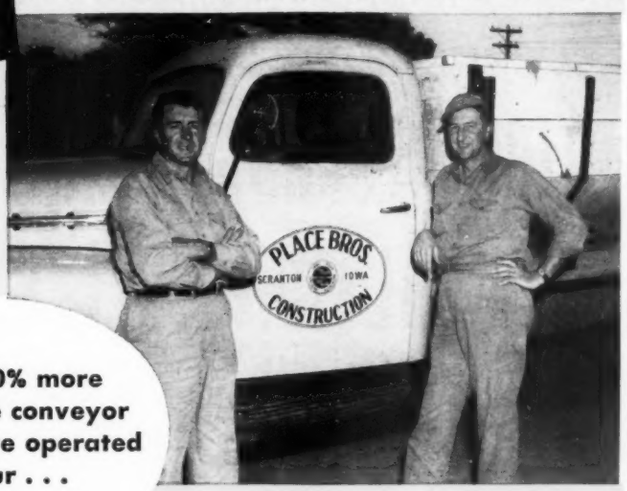

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Burl Place (left) and LeRoy Place are producing ¾" minus crushed gravel to the tune of a 228-ton per hour average . . . with peak production hitting 3560 tons in an 11½-hour day! Average per cent of crush was 20% with portions of the material wet, with some clay. Burl Place says, "This new Super Tandem is very trouble-free and dependable. We can plan on operating at full 11½-hour day every day, weather permitting, and maintaining the high average production that keeps us ahead of our competition."

"OUTSCREENS ANY OTHER SCREEN I'VE EVER SEEN," says LeRoy Place

"That big 48" x 12' horizontal screen is a humdinger for the kind of work we do . . . processing semi-wet material with a high percent of fines. For capacity alone, it outscreens any screen I've seen operate, and by reducing the circulating load, we have less wear on the crushers. Add the screen's trouble-free operation and the result is the extremely low maintenance, high capacity machine we need to operate a successful business in tough competition. Our maintenance cost runs less than ¾ of a cent per yard."

HIGH FLEXIBILITY

The Super Tandem is designed to handle a wide range of crushing and screening conditions. Optional equipment which increases flexibility includes swivel feed conveyor, spray bar attachments and sand ejector screw. Cedarapids Primary Crushing Unit used ahead of the Super Tandem converts it into a high capacity rock plant. "Packaged" Super Tandem separate units are available for stationary operation.

30" WIDE CONVEYORS

As part of the new-design efficiency of the Super Tandem, the width of the delivery conveyors, plant conveyor and under crusher conveyor has been increased to 30" to handle the greater production of the plant.

The newly engineered Super Tandem is designed specifically to meet conditions where extra-high screening capacities are necessary . . . but *remember* . . .

THERE'S A CEDARAPIDS PLANT TO HANDLE EVERY JOB!

The Master Tandem or Unitized Plant for the biggest jobs, the Commander Plant for high output of fine-crushed products, the Rock-It for producing roadstone and aglime, the Junior Tandem and Pitmaster for smaller jobs, the Cedarapids Single Pass Plant for low-cost road maintenance . . . a size and type to fit every job and every pocketbook.

FOR BITUMINOUS MIXING, the big Cedarapids Model E is ready for profitable big-job production, or the Master Plant, Model FA or Model PM Commercial Size Plant are available to meet any quantity, any specification requirement.

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The Cedarapids primary jaw crusher. In the background, a Koehring 405 shovel loads gravel into the trucks which in turn dump the material into the crusher. *C. & E. Photos*

Concrete Paving Job Done in Fast Time

New 5.2-mile section of U. S. 41, two 24-foot pavements divided by 48-foot depressed median, finished in 8 weeks

NEW COMPACTION RECORDS SET BY SOUTHWEST COMPACTION ROLLER

Cat DW21 Tractor equipped with 50-75 ton Southwest Compaction Roller

with Caterpillar Diesel Tractors

USING FEWER PASSES over heavier lifts the Southwest Compaction Roller is setting new records on every job. *On the bigger jobs* the combination of the Southwest Roller and Cat DW21 keeps pace with 24-hour job schedules and the largest earth moving equipment. With the extra flexibility of the exclusive Southwest independently oscillating weight-box units, you get uniform compaction weight on each tire regardless of ground contour. And there is no bridging, no shifting of load.

To suit varying job requirements the hauling yoke is sectionalized for adding or subtracting weight boxes . . . the yoke is also flanged to permit changing the draft beam assembly . . . and the weight boxes can be filled with any material to obtain desired total weight. Sizes and capacities range from 10 to 100 tons. Write for compaction data covering various types of soil and for illustrated literature.

CONSTRUCTION MACHINERY DIVISION
Southwest Welding & Manufacturing Co.
ALHAMBRA, CALIFORNIA

WITH A PAVING SETUP geared to lay more than 110 cubic yards of concrete pavement per hour, a Milwaukee, Wis., contractor completed a 5.2-mile stretch of Wisconsin's new U. S. 41 in a day less than eight weeks. The 73-mile superhighway is being built to replace the old U. S. 41, with its narrow pavements, winding roads and restricted sight distances. It is roughly parallel to the old road, but eliminates the latter's disadvantages and by-passes all population centers.

From Milwaukee, northwest to Richfield, the new route will have two 24-foot lanes shouldered with stabilized gravel on both sides and separated by a 48-foot-wide depressed median. North of Richfield, present construction is of a single 24-foot roadway with provisions for a second such lane when conditions make it necessary.

Joseph D. Bonness, Inc., commenced paving operations on a 5.2-mile divided four-lane section May 12, 1953. It was completed July 6. His contract called for the paving of both roadways with 9 inches of concrete pavement. The lanes were to be flanked by 8-foot shoulders on the outside and 5-foot shoulders on the inside. The grading section beneath the pavement contains a stabilized 6-inch crushed gravel base and about one foot of sand-gravel subbase. The 4 to 1 roadway slopes and backslopes are covered with 4

A workman saws a transverse joint with a Clipper concrete saw. Water comes from a White army half-track.

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Part of the paving setup. The Rex dual-drum paver is in the foreground. The White army half-track with its 1,200-gallon tank provides water for the concrete.

inches of topsoil and were seeded, after the completion of the paving and shoulders, by the grading contractor.

The heart of the Bonness paving setup was a new dual-drum Rex paver. With this machine, 37.4-cubic-foot batches of concrete hit the subgrade every 45 seconds under average conditions. This production of 80 to 82 batches per hour enabled the crew to lay as much as 1,665 linear feet of roadway in a nine-hour day. An average day's output was about 1,550 linear feet.

Placing Steel Forms

After a Cleveland form grader had prepared the trench, the form-setting crew placed the Heltzel 9-inch heavy-duty military-type forms. The form crew stayed almost a full day ahead of the paver by using 3,000 road-feet (6,000 linear feet) of form. The heavy forms were quickly and easily loaded and unloaded with a Pitman Hydra-Lift mounted on a 6300 Chevrolet truck with a flat bed.

After the forms were placed, a Standard subgrader pulled by an International TD-18 tractor brought the roadway to grade. On most of the grading work the contractor had finished the roadway close enough to grade so that the subgrader could complete the fine-grading. Where necessary, a Caterpiller 112 motor grader worked ahead of the subgrader.

Sections of form were omitted at convenient intervals to permit batch trucks to get onto the roadway being paved. Trucks backed from these points to the mixer. Batch hauling from the batching plant to the mixer was subcontracted to Florian Smoody, Oshkosh, Wis., who used 12 trucks with 6-yard double-batch dump bodies.

Mixing water for concrete was obtained from the Menomonee River which intersects the highway within the limits of this project. A Jaeger 4-inch pump fed water to a pair of 2,000-gallon tanks mounted on Studebaker 6 x 6 trucks. In addition to feeding the mixer, these trucks sprinkled the haul roads and plant area, to control dust, and supplied water to the joint saw. Both Studebakers were equipped with pumps, one with a 2-inch Jaeger and the other with a 3-inch

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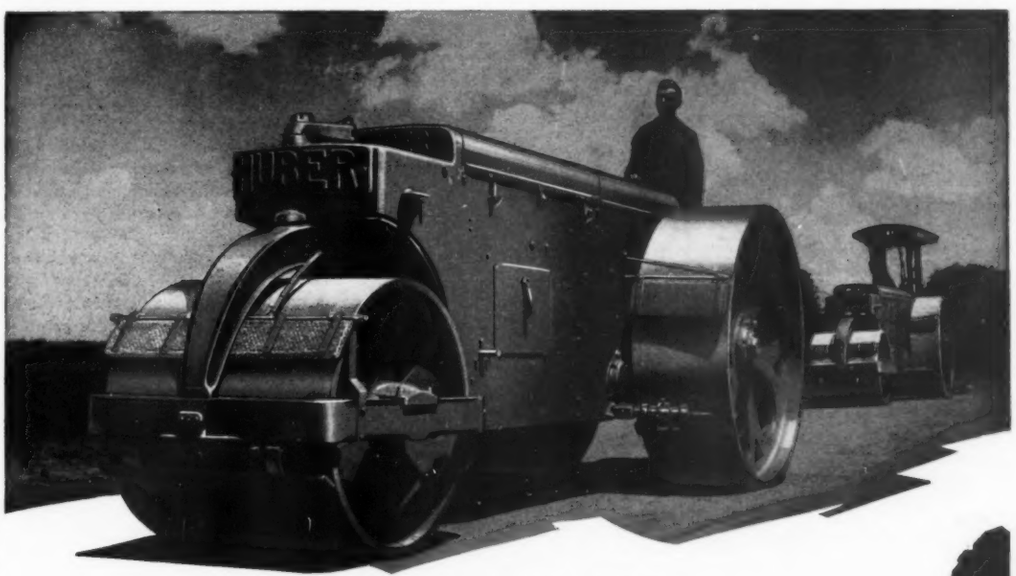

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Since Huber pioneered the "automotive-type" roller in 1923, it has led the industry in the refinement of these versatile machines. Huber has made 3-wheel rollers truly general purpose machines.

FOR GRADE WORK, the Huber 3-wheel is widely used for compaction of earthworks, embankments, sub-grades, trenches and insulation courses. These rollers usually are equipped with 18" face rolls on the 8-ton units, and 20" face rolls on the 10, 12, 14 ton sizes to gain maximum compaction per lineal inch.

FOR FINISHING, Huber 3-wheel rollers normally are equipped with the wide face rear rolls where high compression per lineal inch is not required and the wider rolling width is desirable. They are in wide use for rolling water bound macadam, surface treatment, sheet asphalt and ahead of tandems on asphaltic concrete and other bituminous mixtures.

For more information about Huber GENERAL PURPOSE 3-wheel rollers, ask for our new 20-page bulletin, No. H-150.

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Winch-Lift semitrailer truck unloads aggregate at the batching plant. In the background, a Koehring crane feeds the three-compartment Blaw-Knox batching hopper. *C. & E. Photo*

Concrete Paving Job Done in Fast Time

(Continued from preceding page)

CMC. These trucks filled a 1,200-gallon tank on a White army half-track which followed the mixer and served as its auxiliary water supply. This machine was also equipped with a pump, a 2-inch Jaeger. Each tank had its own pump in case of breakdown or other emergency.

Final adjustment of the subgrade was made by a Carr subgrade planer pulled by the paver. The subgrade was carefully wet down with a hand hose before depositing the concrete.

Reinforcing Ladders

After the concrete was spread and while it was still fresh, the reinforcing ladders which tie the longitudinal center joint were placed in a trench gouged out in the center of the roadway. Reinforcing ladders consisted of sections about 10 feet long made up of two longitudinal bars 3/16 inch in diameter spaced about 20 inches apart. To these were welded cross bars 2 feet long and 1/4 inch in diameter, spaced at intervals of 10 inches. These mats, having the appearance of ladders, were placed by hand in the trench cut in the fresh concrete by a mesh planer.

The mesh planer consisted of a bridge spanning the roadway, mounted on four small wheels which rode on the forms. At the center was a blade 2 feet long which was set to strike off the concrete at the depth at which it was desired to place the reinforcing. This device was towed by the paver. Each time the paver moved ahead, a trench was gouged out and a workman dropped a reinforcing ladder into place.

A Blaw-Knox spreader followed the mesh planer, spreading the concrete uniformly between the forms and filling the trench gouged out for the reinforcing. A Blaw-Knox finisher was next in line, finishing the concrete to the proper transverse crown and grade.

Center-Joint Cutter

The Koehring longitudinal finisher followed, removing the longitudinal irregularities which remained after the passage of the finishing machine. An attachment on this machine formed the center joint.

The longitudinal center joint, known as a cleft joint, was formed by a device patented by Heltzel. A knife approximately 20 feet long was attached to the under side of the longitudinal finishing machine in such a way that the top edge of the knife was just below the finished surface of the concrete, and the lower edge penetrated from 1/3 to 2/3 of the depth of the slab. As the finisher moved along, the knife cut a

4 ACKER TEREDOS' drill 'round the clock for 3 months

In building the new Almendares Vehicular Tunnel between Vedado and Miramar (two popular communities in Havana, Cuba) four Acker Hydraulic Feed Core drills were used for drilling grout holes. Working *around the clock for almost three months*, the four Ackers showed little sign of wear.

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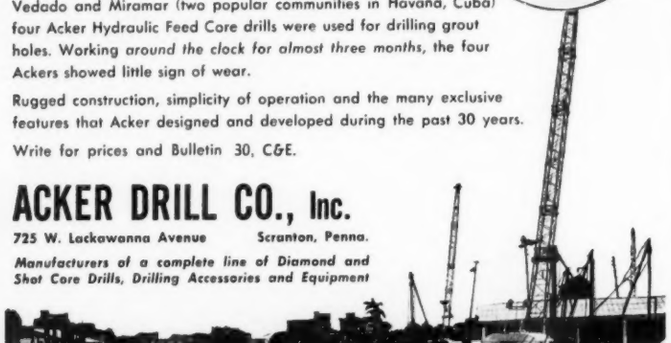

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Choose the RIGHT Twin Bin for a practical answer to QUICKER—CHEAPER—EASIER—DEPENDABLE concrete mixing.

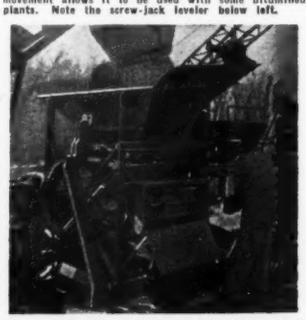
Models A — AW Twin Bin are used with 1-2-3 bag mixers and built to fit your standard wheelbarrow scales for economy.

Models B—BW Twin Bin are used with 1-2-3-4 bag mixers and larger pours.

Models AW — BW are permanently mounted upon a rubber tired trailer. You may obtain the trailer if you want to convert your Models A—B to mobile units.

Twin Bin Model A is shown being loaded. The low height allows the use of small low-priced loaders or slams. The operator is moving the positive shut-off valve to weigh accurately the first time.

Twin Bin Model BW is shown in the forward dumping position. The operator releases the weighed aggregate at the right spot in the mixer skip. The Scale Bin moves on greased packed, jam protected bearings. Its movement allows it to be used with some bituminous plants. Note the screw-jack leveler below left.



Twin Bin Model BW is shown working and being loaded on its permanent trailer mounting. It is easy to set up work, operate and pull. The tongue is in the fold-up position. This model stores and weighs larger batches. Note the Stock Bin with its divided wall and the beams and working parts of the built-in 1000 lb. scales. Three men are doing this job.

For Complete Information On How to Use and Choose the Right Twin Bin for Your Job, Write

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Write for information on distributor territories now open

More footage per day... More footage per blade... LOWER COST PER CUT!

Felker DI-MET MODEL 252

The heavy duty CONCRETE CUTTER that *pushes itself!*

CUTS MORE CONCRETE PER DAY BECAUSE THE MODEL 252 IS SELF-PROPELLED! OVERCOMES OPERATOR FATIGUE, ELIMINATES FREQUENT REST PERIODS, COVERS FAR MORE FOOTAGE IN A DAY!

★ **LONGER BLADE LIFE**—No sudden bumps and jolts to add unnecessary wear and tear on the diamond wheel. Smooth, uniform POWER FEED adds longer blade life—CUTS COSTS! Actual field reports have shown blade life as much as doubled.

★ **DEEP CUTS**—approximately 7" maximum with 18" blade. 13.5 h.p. engine furnishes power to spare.

★ **DOUBLE END SPINDLE** for right or left hand cutting.

★ **HINGED BLADE GUARDS**—Front half lifts, exposing blade for close-up work.

Ask your Felker DI-MET Representative for recommendations.

POWER — SPEED — MANEUVERABILITY PLUS LOW COST!

Felker DI-MET Model 135 Here's the concrete cutter for your every-day jobs . . . trenching, patching, cutting curbs, ramps and dozens of other uses! Light, easily maneuverable with powerful 13.5 h.p. engine. Built for 12" blades but powerful enough for 18" blades (with special guard). 3 wheel design. Other concrete cutters available. *Ask for details!*

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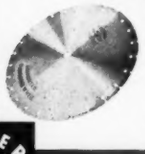

Felker DI-MET the SEGMENTED type diamond blade with *peak performance!* Built by the only manufacturer making both concrete cutters and diamond wheels. Bond variations for every cutting requirement insure *more footage*—lower cost per cut!

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World's Largest Manufacturer of Diamond Abrasive Cut-off Wheels and Equipment

groove in the fresh concrete.

At the back end of the knife, a nozzle forced curing compound into the groove, coating the edges before the concrete could flow back together. The curing compound created a plane of weakness for the center contraction crack, but it did so without disturbing or dislodging the coarse aggregate particles after the finishing process. This method was expected to produce a straight center-line crack without excessive spalling.

Hand straightedges and a burlap drag applied the final finish to the concrete. Curing was by Mac-Seal membrane curing compound applied with a Flex-Plane curing spray. This machine applied a uniform coating of the compound as it crawled along on the forms, the last of the train of paving equipment.

Transverse Joints Sawed

Within 24 hours after the pour, transverse joints were sawed to a depth of 1½ inches at intervals of 40 feet. One man handled the operation, using a Clipper concrete saw with diamond-impregnated cutting wheel. Since the machine required a relatively large amount of water at the blade, the White army half-track with the 1,200-gallon water tank was kept with it. The water tank was replenished by one of the water transports which supplied the paver. Saw cuts were cleaned out and filled with bituminous joint filler the following day.

Aggregates were batched from a Blaw-Knox three-compartment bin having a capacity of 110 tons. Aggregates were fed to the bin by a Koehring 301 crane with an Owen ⅞-yard clamshell bucket. This crane, which is smaller than those which are usually used for such an operation, was assisted on the stockpiles by an International TD-9 tractor with Bucyrus-Erie front-end loader. With this aid, the crane was not required to move to feed the three separate aggregates to the hoppers.

Aggregates were produced by the Palmer Crushing Co., Inc., Slinger, Wis., and delivered to the stockpiles by the Hribar Trucking Co., Frankesville, Wis. Hribar used a fleet of International and Reo trucks with Winch-Lift semitrailer dump bodies carrying 10 to 14 cubic yards per load.

Cement by Truck, Rail

About 57 per cent of the cement used was Universal Atlas Duraplastic air-entraining cement received by rail in hopper-bottom cars at Richfield. Here Bonness set up a Butler track plant to transfer the cement from the cars to two Mack A-30 dump trucks, equipped with special covered boxes having a capacity of 43 barrels each.

The Butler plant consisted of a screw conveyor mounted in a hopper under the track. The screw conveyed the cement from the cars to an elevator which raised it high enough to flow into the top of the truck boxes. Cement was aerated in the cars by hand-held nozzles using air supplied by a Le Roi 60-cfm air compressor.

Spotting the hopper cars with the accuracy required to unload into the under-track screw was accomplished with the aid of a Gar Wood winch powered by a Hercules QXD5 engine.

The remaining 43 per cent of the cement was delivered directly to the batching plant from Huron and Petrowsky storage silos in Milwaukee. This cement was manufactured in Michigan and barged across the lake to Milwaukee. It was delivered to the job by Schwerman Trucking Service, Milwaukee, in tank-like semitrailer trucks carrying 110 barrels per load. Screw conveyors built into the trailers unloaded the cement directly into the receiving bin at the batch plant. White cab-over-engine trucks pulled the big trailers.

Cement was handled at the batch plant by a Heltzel bulk cement setup. The trucks dumped into a receiving hopper from which a screw conveyor carried the cement to an elevator. The elevator carried the cement to the 300-barrel storage hopper from which it dropped by gravity to the scales. A 21-cfm Curtis air compressor aerated the cement in the storage bin to assure

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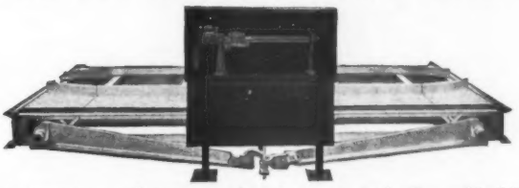
"THE CONTRACTORS' SPECIAL SCALE"



For use at temporary and permanent locations—at stock piles and by bituminous material contractors at the job site. Capacities: 15-18-20-30 tons.

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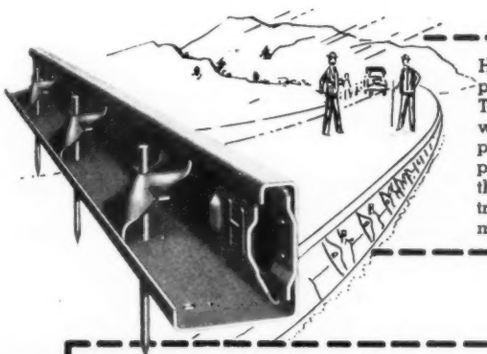
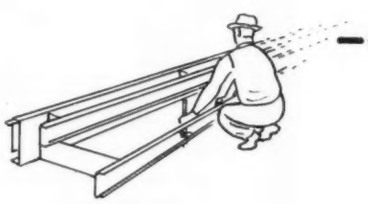
Here's How Leading Contractors Put an End to their Form Problems..

Here's the widest selection of steel forms available today. For more than 40 years, Heltzel has designed and built more types of forms than any other manufacturer. In fact, many form styles in general use today were developed by Heltzel engineers, who are constantly revising and improving their products to give you modern equipment that will do a better job faster.



Here's why the Heltzel Highway Form is so popular: It's extremely easy to set and align — The flanged base means extra strength — All welded construction and "Special Analysis" prime carbon steel make it tougher — It has a positive lock that really supports and transfers the load — The extra wide tread gives greater traction — Helco stakes made from rerolled rail material are the toughest.

On airport construction the now famous HELTZEL DUAL-DUTY Form enables contractors to work two different slab thicknesses with a single set of forms — a real feature because runway and taxi strip or ramp areas can be poured without purchasing a second set of forms. The Heltzel Dual-Duty form is a sturdy, versatile form especially designed to give years of lowest cost service.



Heltzel Curb and Gutter Forms are the quickest-setting available — Light in weight, yet rigid in construction, they are made to required specifications. A single set of forms can be made adaptable to a variety of curb and gutter combinations. Flexible and rigid radius forms can be made to match.

Write today for further details. Ask for Bulletin L-20.

HELTZEL STEEL FORMS

THE HELTZEL STEEL FORM AND IRON COMPANY, WARREN, OHIO

Concrete Paving Job Done in Fast Time

(Continued from preceding page)

free flow and also powered an air vibrator on the scale hopper.

After receiving their charges of aggregate and cement, the batch trucks made a stop beside a platform from which a workman covered the cement with aggregate to prevent excessive loss by blowing.

Concrete Mix

The mix contained three sizes of aggregate: 1½ inch to ¾ inch, ¾ inch to No. 4, and sand. A typical batch contained the following weights:

Type	Pounds
1½-inch coarse aggregate	1,795
¾-inch coarse aggregate	1,203
Sand	1,850
Cement	709

Water-cement ratio was maintained at six gallons per sack. Entrained air averaged four per cent, and the slump was about 1½ inches.

Bonness maintained a well-stocked lubrication and repair setup. Three semitrailers made up the shop and parts-storage layout. The shop wagon contained electric drills, a Hobart arc-welding generator, Kohler light plants for night work, and a complete supply of other tools.

A Dodge truck equipped with an Alemite portable lubrication system carried lubricating oils and greases, filters, a small emergency supply of gasoline, a 300-gallon tank of diesel fuel, and a 21-cfm Curtis air compressor. Operated by one man, this rig serviced all the equipment on the job whenever it was available. Two 25-foot house trailers provided offices for the contractor and for the state highway department inspectors.

Stabilized Gravel Shoulders

Crushed gravel for shoulders, supplied from a nearby pit by C. C. Linck, Beaver Dam, Wis., was placed after the pavement was completed. Linck had a Cedarapids crushing and screening plant in the pit powered by Caterpillar diesel engines. A Koehring 405 shovel supplied material to the crusher. The crushed material was fed by conveyor belt into a hopper which discharged into the trucks. This hopper absorbed the surge and permitted the plant to run continuously whether or not there was a truck ready to be loaded. Crushed-gravel base for the preceding grading job was produced by this same setup.

Personnel

General superintendent for Bonness was Arthur A. Ruesch, vice president of the firm. Norval Toppen was assistant superintendent, Henry King was paving foreman, Nels Olson supervised grading and formwork, and Leonard Sura was in charge of curing and jointing operations.

Resident engineer for the Wisconsin State Highway Commission was Bernard R. Lookatch. Joseph A. Stransky is district engineer, and Emmons L. Roettiger is chief engineer of the Wisconsin Highway Commission. THE END

Catalog on Pipe Tools

■ A bulletin on pipe-cutting tools from Beaver Pipe Tools, Inc., 325 Dana St., N. E., Warren, Ohio, features the company's new Model D aluminum power-drive. The folder stresses the unit's portability and the ease with which threading and cutting operations can be done.

Also covered in the booklet is the Model C power drive, the ½ to 2-inch Model 77 power-drive threader, and the Model 102-PD pipe cutter. Photographs of the Model 55 nipple chuck, chip strainers, reamers, and pipe supports are also shown.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 444.

Symons Expands Plant For Steel-Form Line

A lightweight steel frame form for plywood panels will be put into production soon by the Symons Clamp & Mfg. Co., 4249 Diversey Ave., Chicago 39, Ill. Width of the steel frame is only 2½ inches as compared with 4⅜ inches for the company's wood frame forms. Other advantages claimed for the forms are durability and quick field assembly.

Essick
AUTO-PRIME
MORE WATER!
GUARANTEED!

Essick A.G.C. rated, heavy duty Auto-Prime centrifugal pumps are especially designed for dewatering on construction jobs. These ruggedly constructed self primers pump continuously without attention, day and night, as long as they have fuel! They prime quickly—*re-prime automatically*—force a tremendous volume of water through the line—yet they cost no more than ordinary units—often less!

GUARANTEED by Essick—for over 30 years manufacturers of equipment designed to help contractors make more money.

See your Essick Dealer TODAY

ESSICK

Essick Manufacturing Company

Sales and Service Coast to Coast and in Foreign Countries

1950 Santa Fe Avenue, Los Angeles 21, California

Affiliated with THE T. L. SMITH COMPANY Milwaukee, Wisconsin

CLEAR or WHITE PERMITE

CONCRETE CURING COMPOUNDS

Meet Specifications... Do the Job Better!

Permite PW-40 (White) meets the Corps of Engineers, U. S. Army, specification CRD-C-300-52. Permite W-95 (Clear) meets the Department of the Navy specification No. 13Yd and Navdocks typical specification J1b, July, 1945, Addendum No. 1, March, 1951. Both Curing Compounds meet or exceed specifications of all other Federal Agencies, and of most states, counties and cities. Write for test data.

Where to get PERMITE Curing Compounds *QUICKLY:*

ATLANTA, GA. — Material Service Company, 120 Marietta St., N. W.

BALTIMORE, MD. — Dow-Weld Company, 21st St., West of Howard.

CHARLOTTE, N. C. — Easterby & Mumaw, Inc., 606-609 Builders Bldg.

CINCINNATI, O. — Tricon Distributors, Inc., 3660 Shaw Ave.

CLEVELAND, O. — Lakewood Supply Co., 3450 West 140th St.

COLUMBUS, O. — Scioto Supply Company, 33 N. High St.

COLUMBUS, O. — Whitaker-Merrell Company, 33 N. High St.

JACKSONVILLE, FLA. — Cosco Steel Products Co., 2021 Dennis St.

KANSAS CITY, MO. — B. D. R. Engineering Co., 4243 Pennsylvania Ave.

KNOXVILLE, TENN. — Tennessee Concrete & Supply Co., 709 Cooper St.

MEMPHIS, TENN. — Fischer Lime & Cement Co., Walnut St. at Linden, P. O. Box 37.

MILWAUKEE, WIS. — Cunningham-Ortmayer, Inc., 2106 W. Cornell St.

MINNEAPOLIS, MINN. — Adler Steel Products Co., 802 Thorpe Building.

NASHVILLE, TENN. — T. L. Herbert & Sons, 174 Third Ave., N.

NEW YORK, N. Y. — Geo. A. Comyns Materials & Equipment Co., 40 E. 40th St.

NORFOLK, VA. — Hall Hodges Co., Inc., P. O. Box 7055, Lafayette Station.

OMAHA, NEBR. — The Celltite Company, 802 Douglas Street.

ST. LOUIS, MO. — Tulley Equipment Co., 8900 Watson Road, Webster Groves.

TAMPA, FLA. — Florida Steel Products, Inc., 215 South Rome Ave.

WINNIPEG, CANADA — Thos. Jackson & Sons Ltd., 370 Colony Street.

A few good distributor territories still open.

PERMITE PW-40 (White)
PERMITE W-95 (Clear)

PERMITE CONCRETE CURING COMPOUND

ALUMINUM INDUSTRIES, INC., CINCINNATI 25, OHIO

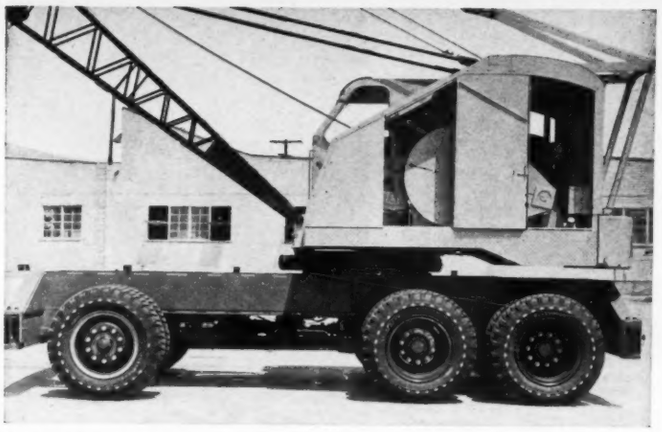
Convert your shop air line . . . into High Hydraulic Pressure!

WITH WATSON-STILLMAN DOUBLE ACTING AIR ENGINE PUMP

Connect this light efficient, portable unit to your low pressure air line. Result — Pressures for all types of Hydrostatic testing.

Can also be used for operation of small Hydraulic machinery and jacks. Available in discharge capacities up to 6000 p.s.i. Write for literature.

WATSON-STILLMAN FITTINGS DIVISION
H. K. PORTER COMPANY, INC.
ROSELLE, NEW JERSEY



The Cook Bros. Model CW-312 crane-carrier has independent power for travel and swing.

Crane-Carrier Feature Is Independent Travel

■ A new self-propelled crane-carrier has an independent power supply that permits separate travel and swing. The Model CW-312, suitable for cranes in the 20 to 25-ton class, is made by the Cook Bros. Equipment Co., Crane Carrier Division, 3334 San Fernando Road, Los Angeles 65, Calif. The power plant of the unit consists of a 100-hp gasoline engine, torque converter, 3-speed and reverse transmission, and auxiliary transmission with emergency and/or parking brake. Operating features include hydraulic steering and air brakes. There are no hydraulic lines running from carrier to crane; controls are operated by mechanical linkage.

With the use of an independent power plant, there is no transmission of power between the carrier and crane. Crane travel-gear and clutches are eliminated, and it is not necessary to have any part of the crane mechanism in operation to propel the carrier. The manufacturer points out that this feature alone saves wear on the crane mechanism and results in decreased maintenance costs. The unit is geared for both slow and high speed.

For further information write to the company, or use the Request Card at page 18. Circle No. 434.

Flexible Metal Tubing For Prestressed Concrete

■ Literature on an interlocking, flexible metal tubing used in prestressed concrete construction is available from the Atlantic Metal Hose Co., Inc., 123 W. 64th St., New York, N. Y. It is claimed that a structure can be built in prestressed design with ½ of the concrete and ⅓ of the steel required for a corresponding structure of reinforced concrete.

In use, the tube is elongated and cut to a length equal to the bar. This allows enough tubing to project beyond the forms to protect the bar threads and prevent concrete from entering the space between the bar and the tube. The bar is then inserted into the tubing which is positioned in the formwork and concrete is poured in. After the forms are removed, the tubing is stripped back to the face of the concrete, and the prestressing follows.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 458.

Naugatuck Division News

John E. Caskey has been elected a vice president of United States Rubber Co., New York, N. Y., and general manager of the company's Naugatuck chemical division. He succeeds John P. Coe, who will handle the company's interests in the transfer of synthetic-rubber plants from the Government to private industry.

Mr. Caskey, together with George R. Vila, newly appointed general manager, will direct all sales, research, and production activities of the division.

Named as assistant to Warren A. Tipton, general sales manager of the firm's mechanical goods division, is Kent A. Blakeslee. Mr. Blakeslee, formerly divisional production planning coordinator, joined the company in 1950 as a sales training assistant in the mechanical goods division.

Three regional managers and two sales engineers have been appointed in the tires division and will work in the construction tire field. Ben F. MacCormack is the new eastern regional manager and will make his headquarters in New York City. The new central regional manager, who will work out of the Chicago, Ill., branch office, is C. N. Clabough. New western regional manager, working from Denver, Colo., is Dugald McKinnon.

Henry Hitchins has been appointed sales engineer under the supervision of Mr. MacCormack. Under Mr. McKinnon's direction is new sales engineer Joseph Bernat.

Boy, they're built! KOLMAN'S rugged construction permits handling heavy loads at constant rates without fear of excessive maintenance expense or break-down time loss. And the price is competitive with lighter conveyors!

Model 101 conveyor 50′ long, 30″ belt.

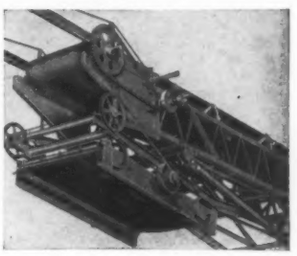
KOLMAN Conveyor Equipped with a KOLMAN VIBRATING SCREEN Makes a

COMPLETE SCREENING PLANT

for low cost, high production screening and loading

KOLMAN CONVEYORS
Portable and stationary models in any desired length for belts 18" to 36" wide. Strong, rigid lattice frame. Head pulley clutch permits operating screen while belt is idle. Built for efficient operation under toughest conditions. Write for bulletin 101.

KOLMAN VIBRATING SCREENS
Single and double-deck models in sizes from 4 to 8 ft. long for conveyors, bucket loaders, and light portable applications. Single, double and triple-deck screens in sizes 4 to 10 ft. long for washing plants, crushers, construction and industrial applications. Write for bulletin 112.

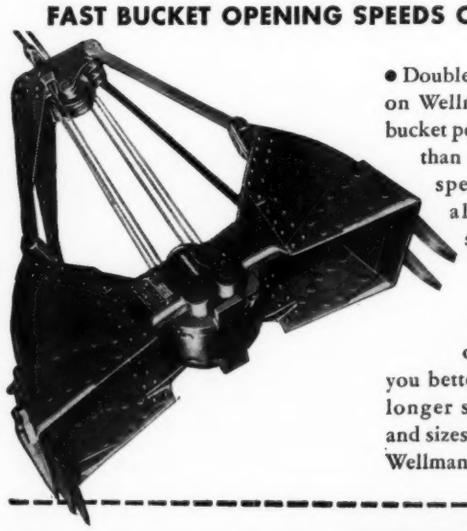


"Folding" feature of Model 101 Conveyor permits weight of screen to be shifted under conveyor for ease of transportation.

KOLMAN Manufacturing Co.
4922 W. 12th St. Sioux Falls, S. Dak.

WELLMAN *Williams Type*

FAST BUCKET OPENING SPEEDS OPERATIONS



• Double-hinge construction on Wellman's multiple-rope bucket permits faster opening than a single hinge. This speeds up operations, also gives a bigger spread in the open bucket for the same headroom.

Wellman's welded-design buckets offer you better performance and longer service. In all types and sizes you'll do better with Wellman!

Want Facts?
Write for free descriptive bulletins.
CLAMSHELL • DRAGLINE • CUSTOM-BUILT BUCKETS • STONE AND WOOD GRABS

THE WELLMAN ENGINEERING COMPANY
7000 Central Avenue
Cleveland 4, Ohio

AMSCO V-MANG

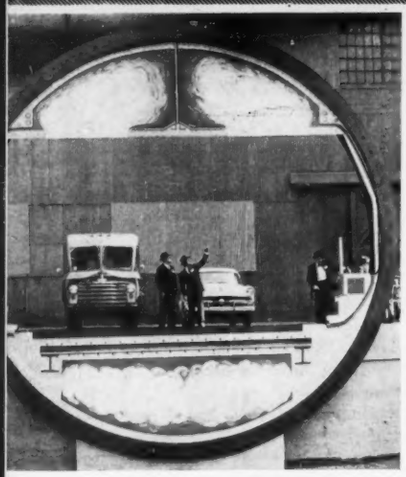
The new moly-manganese electrode that's better than nickel-manganese rods for build-up and repair

- **Tougher deposit**
- **Higher yield strength**
- **better weldability**
- **less cracking**

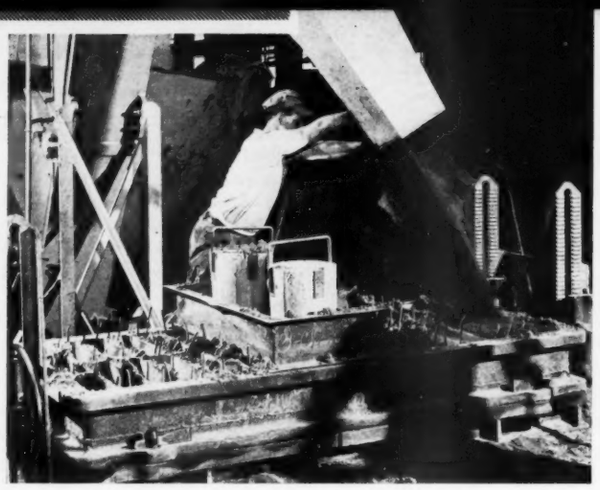
For full engineering and metallurgical information on Amsco V-Mang, write for technical data sheet to Amsco, Chicago Heights, Illinois.

AMERICAN Brake Shoe COMPANY
AMERICAN MANGANESE STEEL DIVISION
395 EAST 14th STREET • CHICAGO HEIGHTS, ILL.

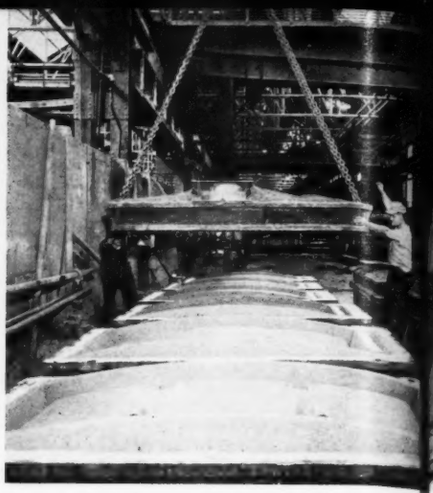
Other Plants: New Castle, Del., Denver, Oakland, Cal., Los Angeles, St. Louis. In Canada: Joliette Steel Division, Joliette, Que. Amsco Welding Products distributed in Canada by Canadian Liquid Air Co., Ltd.



A ring of iron segments is fitted together to show a cross section of the Lincoln Tunnel's new third tube.



Sand mold for tunnel segments is prepared at the Bethlehem Steel Co.'s plant in Bethlehem, Pa. Fifty plates are being cast daily at the plant and this number will be increased to 80 early in 1954.



The upper half of the mold is lowered onto the bottom half. Later, metal is poured into the row of molds on the foundry floor.

Lay TEN TIMES MORE PIPE

PER POUND OF MATERIAL HANDLED

Armco Corrugated Metal Pipe is strong, yet light in weight. In contrast, rigid sectional pipe and monolithic box structures of the same capacity weigh about ten times as much. This means you can install ten times more Armco Pipe per pound of material handled.

With the high cost of today's labor and equipment, this savings in handling can be tremendous. In addition, installation goes along faster and easier. Jobs are completed ahead of schedule. This means more profit for you.

But let's get specific. Suppose you need a 15-inch diameter culvert, 40 feet long. Then you should have two 20-foot lengths of Armco Pipe, plus one coupling band. Each 20-foot length, in 16-gage, weighs 260 pounds. So the total handling weight, including coupling band, would be *only 530 pounds*—an easy, two-man task.

There is an Armco Drainage Structure to answer almost every drainage problem —in the right style, size and protective coating. Write us for recommendations. Armco Drainage & Metal Products, Inc., 4382 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. Export: The Armco International Corporation.

ARMCO DRAINAGE STRUCTURES

This truck is carrying 408 feet of Armco Pipe, ranging from 12 to 60 inches in diameter.

Cast 30,00[illegible] The Outer Rin[illegible]

Casting Of Nearly 30,000 iron and steel segments which will be used to form the outer lining of the 7,944-foot-long third Lincoln Tunnel tube between New York and New Jersey is now under way at the Bethlehem Steel Co. plant in Bethlehem, Pa. The segments will be placed into position under the Hudson River beginning next April.

Mason & Hanger Co., Inc.; the Arthur A. Johnson Corp.; and MacLean-Grove & Co., Inc., all of New York City, have undertaken the $17,260,370 bore-drilling job as a joint venture. They have already started operations. Their contract calls for shore-to-shore construction of 6,258 feet of the tunnel and provides for related land work at each end. It also includes cutting through 720 feet of hard rock under the Palisades in New Jersey, a phase that will not be undertaken, for safety reasons, until the tunnel shield has been pushed into the river bed.

The sinking of the land shafts for the $90,000,000 undertaking has been going on for almost three months. The segments will be needed when the shield starts operations next spring. Completion of the tunnel is expected sometime in 1957.

Fifty of the 3,400-pound segments are being cast daily in the Bethlehem plant's iron foundry. The production rate will be increased to 80 per day in February. More than 28,000 cast iron segments are to be manufactured, along with about 1,800 steel units.

Sand Molds Used

The manufacturing process starts when sand is firmly rammed around a pattern, generally made of wood. A pneumatic molding machine "bumps" the mold at the rate of 140 times a minute to settle the sand properly around the pattern. The mold must not be rammed too hard as that might make it difficult for trapped gases to escape.

After the vibration treatment, the pattern is removed, and the sand

The plates are milled to a close tolerance to permit a tight fit when they are bolted together. More than 28,000 cast iron segments—14 to each ring—will form the tube's outer casting. The 31-foot-diameter tunnel will have a 21½-foot-wide roadway for two lanes of traffic.

Inspected by Port of New York Authority engineers, the segments are stockpiled at the Bethlehem plant. They will be shipped to the construction site after the shield starts driving through the river bed.

0,00egments for Ring New Tunnel

mold is prepared to receive its filling of molten metal. The hot metal is brought to the mold by a ladle from a cupola, which resembles a small-scale blast furnace, with a capacity of from 25 to 30 tons per hour. The segments are made individually, the metal being poured into a long row of molds on the foundry floor.

Once the metal has cooled, newly installed shot-blasting equipment is used to clean sand and scale off the segments at high speed. As cast, each unit is nearly 7 feet long, 32 inches wide, and slightly curved. It takes 14 segments plus a small key or locking segment to make up one complete ring for the 31-foot-diameter tube.

Machining

From the foundry, the segments move on to the machine shop where they are milled to a close tolerance to permit an extremely tight fit when they are bolted into position to become the outer casing for the tunnel. A special machine, which has 20 bits operating simultaneously, drills 20 bolt holes through a minimum thickness of 2¾ inches of metal. The milling, drilling, and beveling machinery in the shop was installed particularly for use in the manufacture of tunnel segments and is not used for any other work.

Following a close inspection by Port of New York Authority engineers, the segments are piled up at the plant to await shipment to the tunnel construction site next year. There, they will be put into position behind a shield which is driven under the river by hydraulic jacks.

The iron segments will be particularly advantageous where the tube passes through mud and silt. The jointed construction of the casing will give the tube the necessary flexibility to accommodate shifting movements of the silt. With their tar-painted exterior, the segments have proven resistant to corrosion and erosion. The interior is to be

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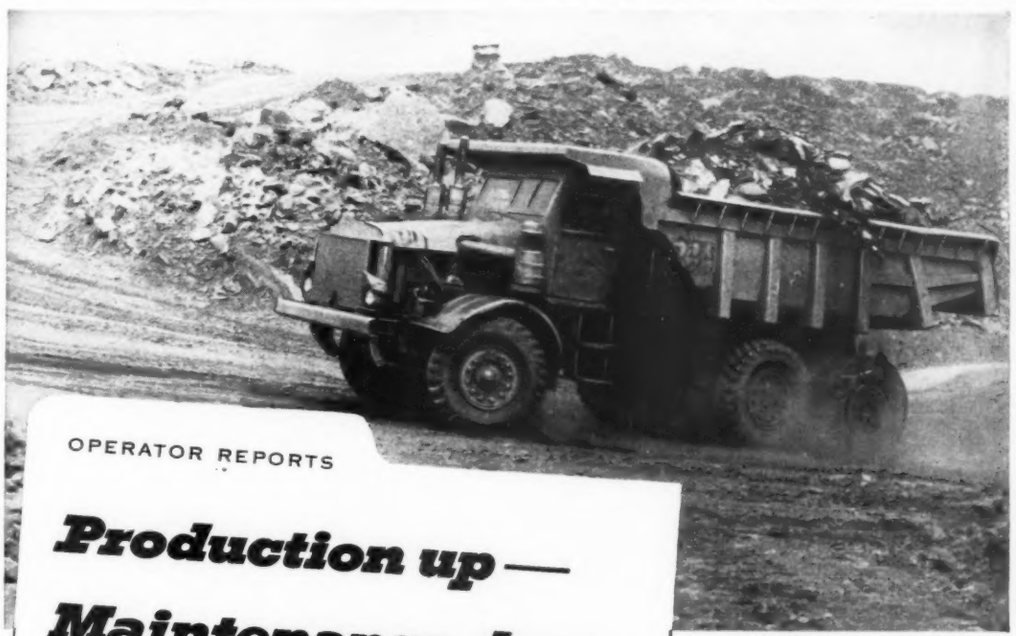


OPERATOR REPORTS

Production up— Maintenance down

Twenty of these Allison TORQMATIC-equipped trucks are working 21 hours a day hauling 34-ton pay loads of coal and overburden over 7½% grades.

The Wadesville Production Company operates 20 Allison TORQMATIC-equipped Euclid rear-dump trucks hauling 42,000 tons daily in its strip mine near St. Claire, Pa. These trucks boost production by making round trips 25% faster than the mechanical-drive units they replaced.

This operator's records show TORQMATIC DRIVES outlast mechanical drives — maintenance time and costs are down too. At routine overhaul periods, mechanics change out the TORQMATIC DRIVES in 2 hours less time than they change out a mechanical drive.

You, too, can cut your heavy-duty equipment operating costs by specifying Allison TORQMATIC DRIVES the next time you buy. Ask your equipment dealer, manufacturer or write:

ALLISON *Division of* GENERAL MOTORS
Box 894CC, Indianapolis 6, Indiana

ALLISON TORQMATIC DRIVES

Unbeatable Team for Maximum Operating Economy

**Quick-shifts* at full throttle with finger-tip hydraulic control.

**Holds* power to load at all times — no clutch pedal to push—no gearshift guess.

**Cuts* maintenance cost by absorbing shock — eliminates engine lugging — prolongs equipment life.

**Only* torque converter-transmission team designed to work as a unit and built by one manufacturer.

MATCHED UNITS BUILT BY ONE MANUFACTURER

Allison TORQMATIC DRIVES

COMPACT, EFFICIENT HYDRAULIC DRIVES FOR CRANES * TRUCKS * TRACTORS * SHOVELS * SCRAPERS * DRILLING RIGS

Applying Mulch—Seeded roadsides along a recently improved section of U. S. 44 get a cover of mulch. The material is fed by hand from a cart into a truck-mounted unit made by the Connecticut State Highway Department, and is then blown onto the area.

Paving—Modernization of U. S. 302 is under way in several areas of central Maine where the road parallels Kennebec River. Here, an Adnun Black Top Paver lays a 1-inch course, followed by a Buffalo-Springfield roller. W. H. Hinman is contractor.

Cast Segments For New Tunnel

(Continued from preceding page)

waterproofed by means of lead caulked into a groove formed at the joint on the inner flanges of the segment.

Steel Segments

Steel segments, because of their greater tensile strength, are to be employed where the tunnel enters rock. They will be better able to withstand the bending stresses at these points. Tapered segments, required to provide for the necessary changes in direction of the tube, present one of the more difficult manufacturing operations. Approximately ten per cent of the segments that will go into the tunnel will have tapered sides.

Recently, a ring of segments was assembled vertically at the plant to illustrate to a group of Port Authority engineers what a cross section of the completed tube would look like. A papier-mache interior was fitted over the shell of segments to simulate details. The roadway, accommodating two lanes of traffic, will be 21½ feet wide.

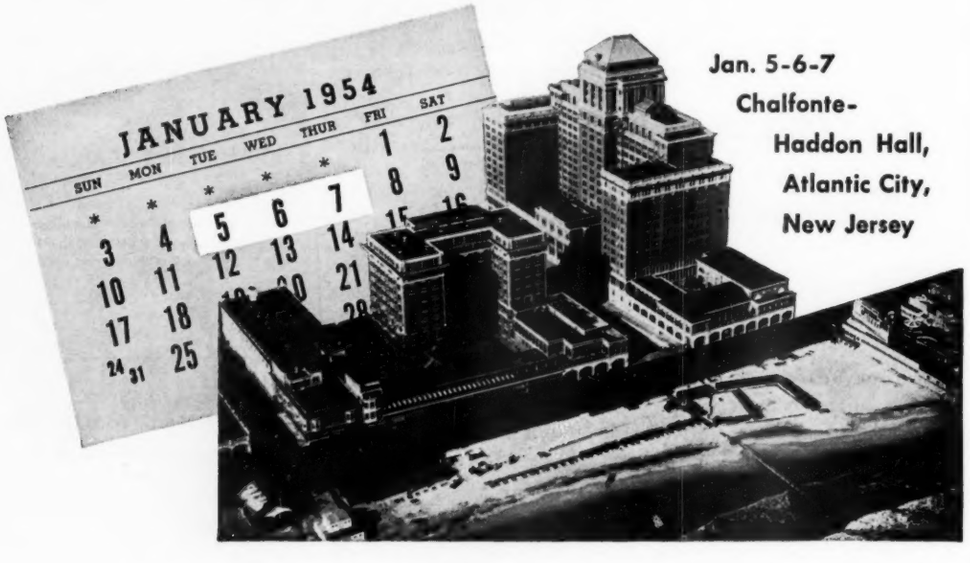
Fresh air is pumped into the tube via a duct beneath the road surface. A second duct, located above the ceiling, draws exhaust gases out of the tube. THE END

The world's greatest storehouse of unused water power, estimated at 130 million horsepower, is in the Belgian Congo.

MAKE PLANS **NOW** TO ATTEND THE

1954 Annual Meeting

AMERICAN ROAD BUILDERS' ASSOCIATION



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AMERICAN ROAD BUILDERS' ASSN. 1902

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AMERICAN ROAD BUILDERS' ASSOCIATION

WORLD CENTER BLDG., WASHINGTON 6, D. C.

USE RIGHT BUCKET FOR THE JOB

Hayward makes all three — clamshell, electric motor, orange peel. A Hayward recommendation is unbiased.

Trade HAYCO Mark

THE HAYWARD CO., 32-36 Dey St., New York

Hayward Buckets

CONTRACTORS AND ENGINEERS

Test Wire Fabric—A Barber-Greene paver spreads asphaltic concrete over welded wire fabric in a test application of the material in Washington, D. C. The wire sheets are overlapped transversely 6 inches and tied to prevent curling and slipping.

Sleds, made of 12-inch steel curbing forms, are suspended under the paver by chains. They iron out the fabric sheets and keep them in place as the paver spreads the binder course directly over the existing concrete pavement.

Welded Wire Fabric In Asphaltic Concrete Tested on Road Project

The first experimental use of welded wire fabric in asphaltic concrete pavement in the eastern United States was made by the District of Columbia Highway Department in a project on 16th Street, N. W., in the nation's capital. The purpose of the test was to determine the effectiveness of the fabric in preventing rippling and piling up in pavement and in controlling crack formation.

The wire mesh and bituminous combination was used on about 3,000 square yards of the road. The job was done in sections; unreinforced sections of plain asphaltic concrete alternating with reinforced sections. Prior to paving operations, photographic studies of crack formations in the existing concrete pavement were made.

The welded wire fabric used was made of flat 11½ x 7-foot sheets of number 10 gage cold-drawn steel wire. Longitudinal wires were spaced at 6 inches and transverse wires at 3 inches to help prevent rippling often caused by heavy traffic loads. These sheets, laid directly on the existing pavement, were overlapped transversely for 6 inches. In several places, they were tied with wire to prevent their curling and slipping, and the truck and paver passed over them. The 11½-foot width of the mesh provided a 3-inch clearance from both edges of the 12-foot

(Concluded on next page)

TRANSITS and LEVELS

NEW OR REBUILT SALE OR RENT

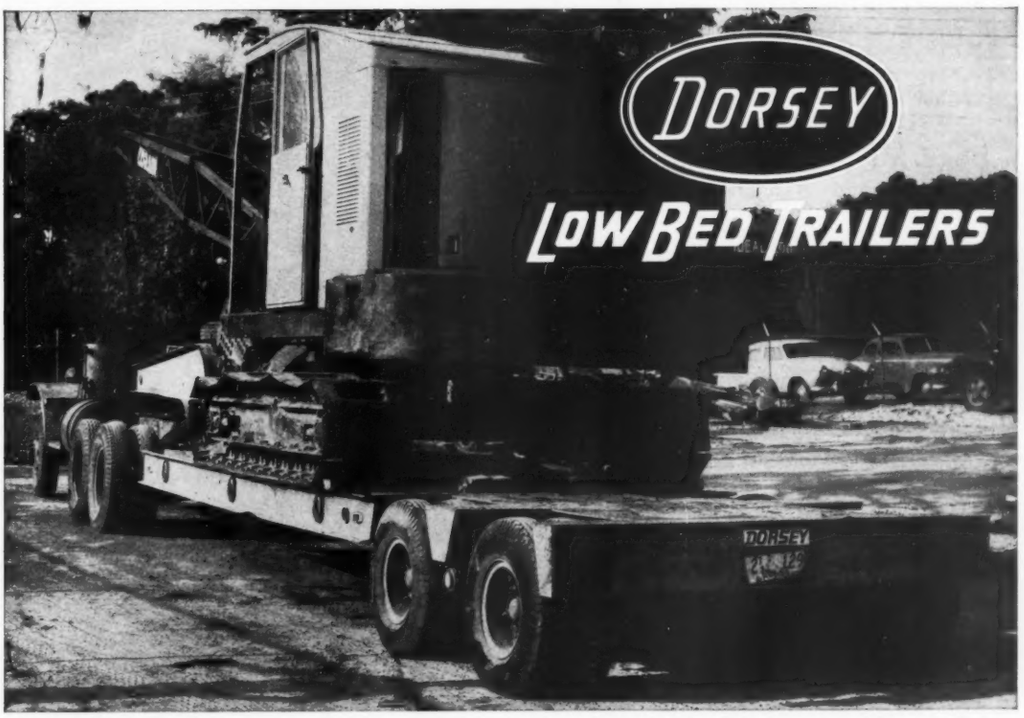
HEADQUARTERS FOR REPAIRS — any make

We will buy or trade in old Transits Levels, Alidades, etc. Send instruments for valuation.

Write for Catalog EC-312 of Engineering Instruments, Engineering Field Equipment and Drafting Room supplies.

WARREN-KNIGHT CO.
Mfrs. of Transits & Levels
136 N. 12th St., Philadelphia 7, Pa.

HOW to keep equipment in several places at once . . .



This Dorsey Model MTS, 20-ton capacity, is ideal for keeping the right machinery in the right place at the right time! With four different road construction jobs under way at sites as much as 200 miles apart, M. C. Farmer Construction Company of Mobile, Ala., reports the trailer hasn't required a repair job in its 16,000 miles service carrying "all kinds of loads over all kinds of roads".

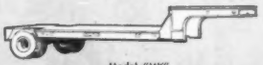
Call your Dorsey Distributor—or wire us collect

DORSEY TRAILERS • ELBA, ALABAMA

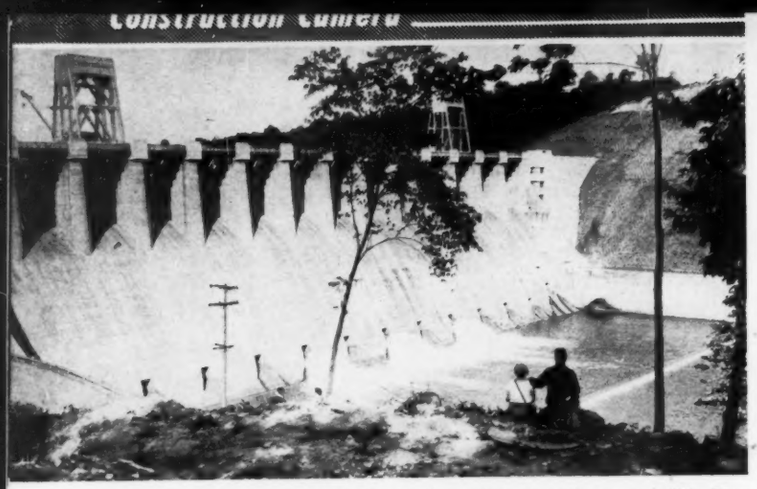
THERE'S A DORSEY HEAVY-DUTY TRAILER FOR EVERY NEED

Oil Field Floats
Capacities up to 75,000 pounds. Loads easily, travels swiftly.

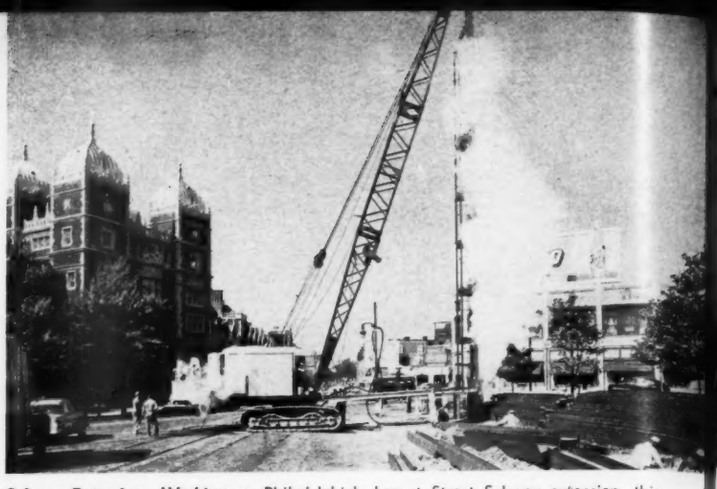
Tilt-to-Load
Easy to load and to handle. For fast, economical service.


Model "MK"
10 or 15 ton capacities. Level or drop decks. Semi or full trailers.

Model "MT"
35 to 75 ton capacities, with up to 100 tons on special order.



Flood Control Structure—A key link in the western Pennsylvania and Ohio River Valley flood control system is Conemaugh Dam in Pennsylvania. The $46,000,000 structure is one of 17 flood control projects in an area that has experienced heavy damage from rampaging waters for a number of years. *Wide World Photo*



Subway Extension—Working on Philadelphia's Locust Street Subway extension, this Lorain 80 crane drives a 12-inch H-pile into the ground. The crane is equipped with a 70-foot boom and 65-foot set of leads. Steam for the McKiernan-Terry 1183 power hammer is supplied by a Littleford boiler.

Welded Wire Fabric

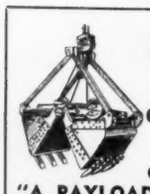
(Continued from preceding page)

binder course.

To prevent the fabric from being caught in the paver, the transverse wires of the mesh were faced down so that the spreader slid along the longitudinal wires. Six sleds were attached to the Barber-Greene 10-foot paver to keep the fabric flat against the pavement and in proper position. These sleds, made of 12-inch curbing forms, were suspended open side up from a steel bar at the front of the paver.

Four sleds were placed between the crawler tracks and a single sled on each side of the machine. They extended under the paver to a point just short of the conveyor screw. When the machine moved along, the sleds moved over the longitudinal wires pressing the fabric close to the pavement as the asphaltic concrete was applied.

Harold F. Clemmer, D. C. Highway Department materials engineer, headed the project. The contractor on the job was Donaldson Paving Co. of Washington, D. C. This test application of the wire fabric, together with other trial applications in Minnesota, Illinois, and Indiana, is now being studied to determine the ability of the material to control and minimize cracks in asphaltic pavement. It is thought that the material will check the deterioration of reinforced asphalt by minimizing cracks which might open up as a result of cracks in the concrete base. When the results of the test in Washington and other cities become available, the Wire Reinforcement Institute, Washington, D. C., will release the data and make recommendations for increasing the effectiveness of the fabric in asphaltic concrete pavements.



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Since 1892
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CLAM SHELL BUCKETS
with
POWER
ON BOTH SHELLS
"A PAYLOAD EVERY TRIP"
The ONLY Bucket that DIGS-IN instead of Lifting-Out.
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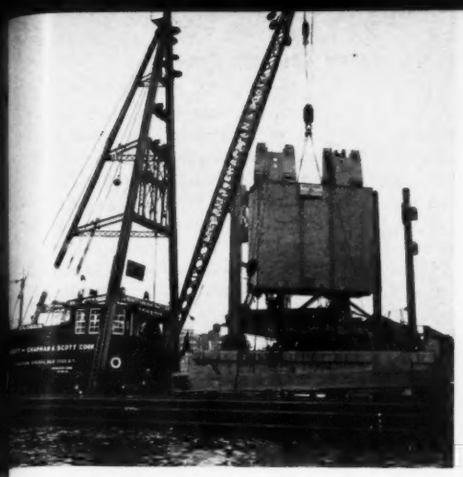
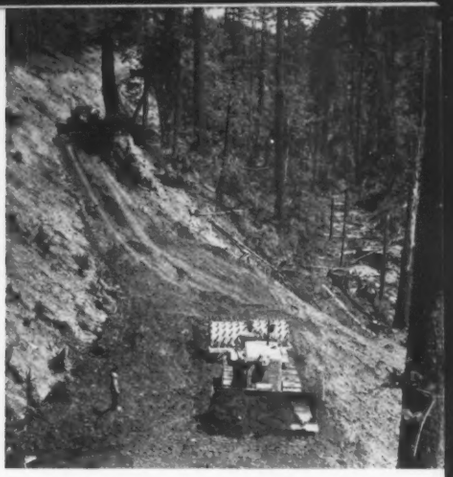
934 W. HURON ST. CHICAGO 22, ILL.

Introducing... the New Humdinger
RALPH B. CARTER CO.
...for PEAK PERFORMANCE On Every Job
CARVER PUMPS
PUMPS FINE TODAY... BUT HOW ABOUT TOMORROW?
With Rex and only Rex
You're assured new pump efficiency
For the lifetime of the pump because...
ONLY REX HAS THE ADJUSTABLE AIR PEELER!
REX
WELLPOINT PUMP
MORE
LESS
COMPLETE
SHORTCUTS TO GREATER PROFITS
with equipment
Chicago Pneumatic
10" Jaeger lifts creek over 30' bank
THE JAEGER MACHINE COMPANY
TWIN PRIME PUMPS
Bury it! Forget it!
Essick AUTO-PRIME
MORE WATER! GUARANTEED!
ESSICK
IT'S HERE AT LAST!
NEW! GORMAN-RUPP
BEST DIAPHRAGM PUMP
STERLING NO-CLOG PUMPING SAVES YOUR PROFITS!
STERLING
PUMP RENTAL is "RUGGED BUSINESS"
MARLOWS
MARLOW PUMPS
Every contractor should have these three money savers!
CLECO PAVING BREAKERS
CLECO SUMP PUMP
CLECO BACKFILL TAMPER
CLECO DIVISION
Simplest, sturdiest, most economical contractor's pump ever built
WORTHINGTON
GET FAST DUAL PRIMING—DEPENDABLE LONG LIFE OPERATION—
and KING SIZE in VALUE!
DUAL PRIMERS
CONSTRUCTION MACHINERY COMPANY
•Barnes Manufacturing Co., Ralph B. Carter Co., Carver Pump Co., Chain Belt Co., Chicago Pneumatic Tool Co., Cleco Division of the Reed Roller Bit Co., Complete Machinery & Equipment Co., Construction Machinery Co., Essick Manufacturing Co., Foundation Equipment Corp., The Gorman-Rupp Co., The Jaeger Machine Co., Marlow Pumps, Ingersoll-Rand Co., Ohler Machinery Co., Rice Pump & Machine Co., Sterling Machinery Co., Worthington Corp.



Railroad Bridge—A 77-ton steel counterweight casing, assembled on the deck of the Colossus, Merritt-Chapman & Scott's floating derrick, is placed on a railroad span across the Harlem River in New York.

Twin Tunnels—Looking out from one of Venezuela's $20,000,000 Boqueron tunnels cutting through the foothills of the Andes. They are part of a new highway system that will cut traveling time from Caracas to La Guaira from about an hour to 20 minutes.



Earth-Moving—In the rugged country at Berry Summit, Calif., a Caterpillar D8 with dozer and sheepsfoot roller work on a road realigning job near U. S. 299.

Pumps*

Water in the wrong place is bad news for every contractor. But water in the right place at the right time is an essential ingredient in modern construction.

That's why contractors buy so many pumps. And to reach these contractors, the overwhelming majority of pump manufacturers choose CONTRACTORS AND ENGINEERS to carry their sales message.

Construction machinery manufacturers place their advertising in C&E because they know it is the leading magazine of the industry, as demonstrated by four facts:

1. **It carries more editorial material than any other monthly publication in the field, including more pictures.**
2. **It also carries a higher proportion of editorial to advertising content.**
3. **C&E carries more display advertisers than any other monthly, and,**
4. **more *exclusive* advertisers.**

Truly, CONTRACTORS AND ENGINEERS is the market place of modern construction.

Contractors and Engineers

marketplace of modern construction

470 Fourth Avenue, New York 16, N. Y.

Harnischfeger Appoints

J. F. Catalane has been appointed sales manager of the P&H small excavator division of Harnischfeger Corp., Milwaukee, Wis. Mr. Catalane began his career with the company in 1945, as a salesman in the New York district office. In 1950, he was put in charge of sales for the entire line of P&H products in upper New York, operating from Syracuse. He succeeds F. C. Edwards, recently appointed general manager of the P&H diesel division at Crystal Lake, Ill.

Assisting Mr. Catalane is Robert P. Jones, formerly with the P&H soil stabilizer division.

The post of excavator sales manager for the corporation has been filled by C. R. Morris. In addition to assuming these duties, he will continue as P&H Wisconsin district sales manager, a position he has held since 1951. Mr. Morris, who has been with the organization since 1948, will continue to make his headquarters in the Milwaukee office.

Barber-Greene Appoints

Barber-Greene Co., Aurora, Ill., manufacturer of bituminous paving equipment, belt conveyors, car loaders, loaders, and ditchers, has appointed Edward J. Curtin sales manager of the northeastern sales area. Mr. Curtin, whose territory includes all of New England, New York, and part of New Jersey, will operate from Boston, Mass. He formerly served as a member of the Barber-Greene field engineer section.

Mr. Curtin succeeds Earl F. Lamprey, who will supervise export activities in the New York area and will also be charged with government liaison on export matters.

Vulcan Tools

— FOR —

Rock Drills, Pavement Breakers and Clay Diggers

Vulcan Tool Manufacturing Co.

35-43 Liberty Street, Quincy 69, Mass.

Branch Offices and Warehouse Stock.

57 Leonard St. 34 No. Clinton St.

New York 13, N. Y. Chicago 6, Ill.

Send for catalog or see your local distributor.

Distributor Doings

Prime-Mover Adds 4 Dealers

Four new distributors have been appointed by The Prime-Mover Co., Muscatine, Iowa, manufacturer of a gasoline-powered gear-driven wheelbarrow of ¾-ton capacity. Three are in Florida, and one is in Louisiana.

The Southern States Equipment Co., 401 Celeste St., New Orleans 11, has been named in Louisiana. In Miami, Fla., Blanchard Machinery, Inc., 601 N. W. 5th St., has been appointed. M. D. Moody & Sons, Inc., 4652 Phillips Highway, Jacksonville 7, and the Highway Equipment & Supply Co., 1016 W. Church St., Orlando, are the other Florida distributors.

Standard Steel Distributor

Western Machinery Co., 124 E. Buchanan St., Phoenix, Ariz., has been named a distributor for Standard Steel Corp., manufacturer of hot plants and surfacing equipment. R. B. George is sales manager of the company, which will cover Arizona.

Gar-Bro Names Eight Dealers

Eight distributors have been named by the Gar-Bro Mfg. Co., 2415 E. Washington Blvd., Los Angeles 21, Calif., manufacturer of concrete placing and materials-handling equipment. All are in the northeast.

Austin Supply Co., Inc., Philadelphia, Pa., will cover the Philadelphia area. In Massachusetts, the Builders Equipment & Supplies Co. has been named in West Medford, and Eastern Equipment Sales, Inc., has been appointed in Springfield. Connecticut will be handled by The Holmes-Talcott Co., Hartford and New Haven.

The Builders Equipment & Supplies Co. will cover Rhode Island. New Hampshire will be handled by New Hampshire Explosives & Machinery Co., Inc., Concord.

In Vermont, Interstate Equipment & Supplies Co., Inc., Barre, has been appointed. The Stanley & Cadigan Co., South Portland, will cover Maine.

Gunderson-Taylor Moves

The Gunderson-Taylor Machinery Co., Denver, Colo., originator of the Gunderson-Taylor Triplex backfill tamper and a leader in the field of machinery sales and rentals, has moved to new and larger quarters at 1201-1237 Shoshone St. in Denver.

The new location has 5,000 square feet of yard space for housing the company's rental fleet, and 17,000 square feet of interior space, compared to 1,500 square feet at the old location.

The firm, incorporated in 1946, is headed by G. W. Gunderson, a former sales manager for Gardner-Denver. His partner is Edward Taylor, a veteran of the construction machinery field.

Edward R. Bacon Names Mgr.

Max B. Campbell has been named manager of field salesmen by the Edward R. Bacon Co., Folsom at 17th St., San Francisco 10, Calif. Mr. Campbell will make his headquarters at the San Francisco office but will spend much of his time in the field.

Joy Appoints Dealers

The Joy Mfg. Co., Pittsburgh, Pa., has appointed four distributors for its line of construction equipment. Portions of eastern Iowa and western Illinois will be handled by the All Wheel Drive Co., 1344 W. Third St., Davenport, Iowa. Covering Iowa is the Iowa FWD Truck & Equipment Co., 1604 Grand Ave., Ames. Covering northwestern Florida is the Industrial Marine Supply Co., Pensacola. American Machine Co., W. 1026 Broadway, Spokane, Wash., will be a Joy distributor for eastern Washington and the northwestern section of Idaho.

Three New Cleco Distributors

The Cleco Pneumatic Tool Division of the Reed Roller Bit Co., Houston, Texas, has named three new distributors for Cleco products, two in New Jersey and one in Africa. They will handle the division's line of air-powered tools, accessories, and related products.

In New Jersey, J. Schlank Co., Inc., Harrison, and the Allied Equipment & Supply Co., Bayonne, have been appointed. Matermaco-Congo, Elizabethville, Belgian Congo, is the new African distributor.

Clark Appoints W. Va. Dealer

The Clark Equipment Co., Buchanan, Mich., has appointed the Crunkleton Co., 5324 McCorkle Ave. S. E., Charleston, W. Va., as a distributor for Clark's full line of materials-handling equipment, including fork-lift trucks, towing tractors, and powered hand trucks.

Leslie D. Crunkleton, Jr., is the manager of the new dealership, which will cover various counties in the states of West Virginia, Ohio, and Kentucky.

Dart Appoints Thackaberry

M. N. Thackaberry Co., 304-308 E. Third St., Los Angeles, Calif., has been appointed a distributor for the Dart Mfg. & Sales Co., 1246 Champa St., Denver 4, Colo., manufacturer of concrete vibrators. The Thackaberry firm, pioneers on the west coast of concrete placement through vibration, will cover the Los Angeles area.

Anderson Appoints Walter

Wilbur L. Walter has been appointed a field sales representative for the W. H. Anderson Co., 47 W. Seven Mile Road, Detroit 3, Mich., dealers in construction and industrial machinery and supplies.

A resident of Michigan for more than 18 years, Mr. Walter has spent 12 of those years as a sales promotion manager for Anderson and Moto-Crane Service, Inc., Detroit.

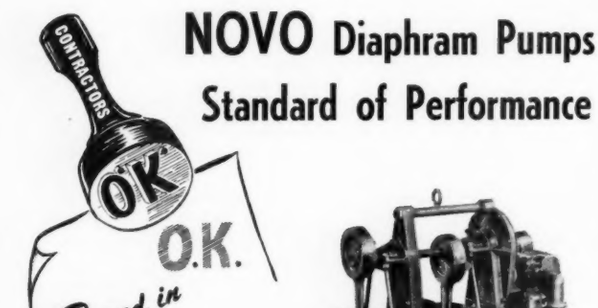
Dravo-Doyle Names Thornton

William Thornton has been appointed assistant to the sales manager of the Dravo-Doyle Co., 1203 Dravo Bldg., Pittsburgh 22, Pa. The company, a wholly owned subsidiary of the Dravo Corp., Pittsburgh, Pa., is engaged in the sale and rental of new and used construction equipment.

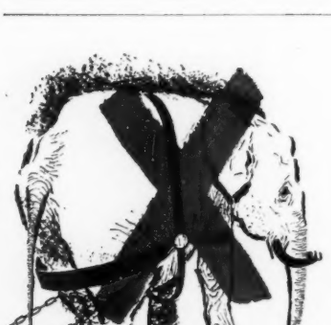
(Concluded on next page col. 3)

50 years NOVO stamp of approval

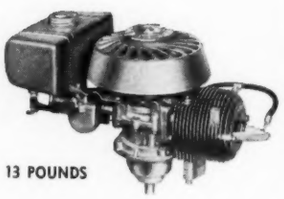
NOVO Diaphram Pumps
Standard of Performance



NOVO ENGINE CO. LANSING MICHIGAN



be modern—
go Lightweight



13 POUNDS

The POWER PRODUCTS Lightweight packs more power per pound

When it comes to lightweight power nothing can touch this engine. Not only is it amazingly lightweight, but it has every important quality feature to assure long, dependable performance

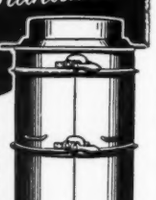
- LIGHTWEIGHT
- MINIMUM EFFORT STARTING
- LONG LIFE, LESS MAINTENANCE
- FULL CARBURETION
- BALL BEARING MAIN BEARINGS
- SEALED DRIP PROOF CRANKCASE
- FULLY ENCLOSED FLY-BALL GOVERNOR
- NO OIL CHANGING OR CHECKING
- CLOG FREE COOLING SYSTEM

For portable equipment, you can't find a better engine for lightweight and dependability.

be modern-
go Lightweight

PP POWER PRODUCTS CORPORATION
GRAFTON, WISCONSIN

THE "Quinn Standard" FOR CONCRETE PIPE



The Quinn Standard is known as the best the world over, wherever concrete pipe is produced and used. Backed by over 40 years' service in the hands of hundreds of Quinn-educated contractors, municipal departments and pipe manufacturers who know from experience that Quinn pipe forms and Quinn mixing formulas combine to produce the finest concrete pipe at lowest cost.

QUINN HEAVY DUTY PIPE FORMS

For making pipe by hand methods by either the wet or semi-dry processes. Built to give more years of service—sizes for pipe from 10" up to 120" and larger—tongue and groove or bell end pipe at lowest cost.

WRITE TODAY. Complete information, prices, and estimates sent on request.

Also manufacturers of
QUINN CONCRETE PIPE MACHINES

QUINN WIRE & IRON WORKS 1645 - 17th St. Boone, Iowa

The Hough HM Payloader.

Front-End Loader Gets Torque Converter

■ The performance of the Hough Model HM Payloader tractor-shovel has been improved by the addition of a hydraulic torque converter, the manufacturer reports. This change has been made in the gas and diesel-engine models as well as in the Model TM tractor developed for use on heavy-duty towing operations.

The converter is a 3-element unit that multiplies the torque output of the engine in direct proportion to the load requirements. Together with the four-speed full-reversing transmission, it provides a smoother drive than has previously been available. By reducing the amount of clutching and gear-shifting needed, the converter also reduces operator fatigue. In addition, the drive acts as a cushion for the entire power train.

For further information write to the Frank G. Hough Co., 762 Seventh St., Libertyville, Ill., or use the Request Card at page 18. Circle No. 424.

Line of Portable Hoists

■ A condensed catalog presenting its full line of hoists is available from the Coffing Hoist Co., 800 Walter St., Danville, Ill. The catalog contains illustrations, descriptions, and specifications for over 100 types and sizes of portable hoists.

Among the units described are the company's ratchet-lever hoists in both roller and coil-chain models with capacities from ¾ to 15 tons. Also shown is a complete line of standard and specialized spur-gear hoists, the Quik-Lift electric hoists, the all-purpose ratchet-lever Hoist-Alls, and the Mighty Midget Pullers, designed to hang on a tool belt.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 438.

Colorado Fuel Promotes

V. L. Nicoli has been promoted from assistant superintendent to superintendent of the wire mill at the Buffalo, N. Y., plant of the Wickwire Spencer Steel Division of the Colorado Fuel & Iron Corp., 575 Madison Ave., New York, N. Y. Replacing Mr. Nicoli as assistant superintendent is L. P. McNamara, formerly general foreman.

The wire mill is currently undergoing a modernization of facilities for producing hard drawn wire.

Chain Belt Changes

Robert G. Kuhnmuench has been appointed western district manager of the Chain Belt Co., Milwaukee, Wis. Richard Seaman will replace Mr. Kuhnmuench as eastern district manager.

Mr. Kuhnmuench started with Chain Belt as a student engineer in 1946. He had been eastern district manager since March, 1952. Mr. Seaman also joined the firm in 1946. Most recently he was assistant to the sales manager. The new district managers will operate from Los Angeles, Calif., and New York City respectively.

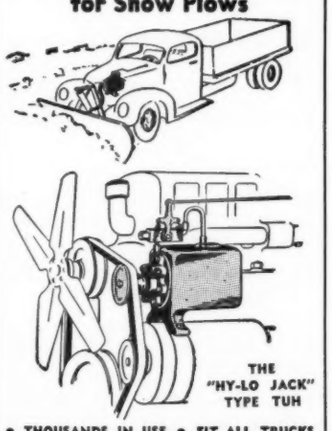
Changes at Timken

The Timken Roller Bearing Co., Canton 6, Ohio, has divided the responsibility of its Milwaukee, Wis., industrial sales division among the division's three district offices, following the retirement of George W. Curtis, division sales manager. Robert Morgan, district manager at Moline, Kans., continues in that capacity. Floyd Hartshorn has been named district manager at Milwaukee, Wis., and Donald Van Orman at Minneapolis, Minn.

Sullivan Named by Le Roi

The newly appointed manager of contractor sales for the construction and mining division of Le Roi Co., Milwaukee, Wis., is Paul D. Sullivan, who has had experience in heavy construction sales with Clyde Equipment Co. and other firms. As manager, Mr. Sullivan will be responsible for Le Roi sales to large contractors throughout the country.

POWER HYDRAULICS for Snow Plows



THE "HY-LO JACK" TYPE TUH

• THOUSANDS IN USE • FIT ALL TRUCKS • FAN BELT OR ELECTRICALLY DRIVEN MODELS • CLUTCH MODELS NOW AVAILABLE

• Write Hydraulic Division

MONARCH ROAD MACH. CO.
323 North Front Ave., Grand Rapids 4, Mich.

Distributor Doings

(Continued from preceding page)

Euclid Names Distributors

The Western Tractor & Equipment Co., 2230 First Ave. South, Seattle, Wash., has been named to handle the sale of earth-moving equipment manufactured by the Euclid Road Machinery Co., Cleveland 17, Ohio. The firm will cover western Washington and Alaska. Western, headed by Harry B. Fay, Sr., has branches in Chehalis and Tacoma, Wash., and Anchorage and Fairbanks, Alaska.

Also named was the Colorado Builders' Supply Co., 1300 W. Evans Ave., Denver, Colo., to handle Colorado, most of Wyoming, and 11 western counties in Nebraska. The Denver firm, which has a branch in Casper, Wyo., is headed by James D. Maitland.

A-C Names Distributor

Electric Supply Co., Inc., 457 Greenwood St., Wichita, Kans., has been named a distributor for motors, controls, and transformers manufactured by the Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Kansas counties served by the new distributorship are Reno, Kingman, Harper, Harvey, Sedgwick, Sumner, Butler, and Crowley.

McNall Is Lima Distributor

The McNall Machinery & Supply Corp., 600 D Avenue N. W., Cedar Rapids, Iowa, has been named a distributor for the construction equipment division of the Baldwin-Lima-Hamilton Corp., Lima, Ohio.

TRADING POST

CLASSIFIED ADVERTISING

An advertising inch in the Trading Post is measured ⅞-inch vertically on one column. Space reservations close in the New York office on the 10th of the month preceding publication. Send your classified copy to:

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470 Fourth Avenue, New York 16, N. Y.

IMMEDIATE DELIVERY

1—Allis-Chalmers Model B tractor with mower.
1—Allis-Chalmers AD-3 Motor Patrol completely rebuilt & guaranteed.
1—Novo traffic line marker.
1—Buckeye Model 402 Ditcher.
1—A-C Model HD5G Front End Loader. Completely rebuilt.
1—Sasgen Dual Drum Hoisting Unit, New Condition, Low Price.
1—Adams 414 Motor Patrol, fair condition.
1—¾ yd. Backhoe attachment for ¾ yd. P & H Crane. New.
1—¾ cy. Shovel attachment for Buckeye 70 Clipper. New.
2—LeTourneau Super-C Tournapulls, good condition, very cheap.
2—LeTourneau D Roadsters, good condition, reasonable.
1—2-U Series Cat D-8's with Cable Angle Dozers. A1 condition. Priced to sell.
1—Cat D-6. 400 Hours. 45 days old. Priced to sell.
1—Schield Bantam T-35 Truck Crane, with Backhoe, Dragline, and clamshell attachments. Practically new, very low price.
1—A-C Model HD-7W Tractor with Hydraulic Bulldozer. Clean machine. Very reasonable.
1—A-C Model HD-10W Tractor with either cable or hydraulic bulldozer. Rebuilt and guaranteed. Cheap.

Illinois Road Equipment Co.
1310 E. Jefferson St., Springfield, Ill.
Phone 2-7709

STEEL PIPE STEEL
ALL SIZES AND TYPES
ANY QUANTITY
OFFER US YOUR SURPLUS NEW PIPE
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Engineers—Foremen—Office Men
Learn latest methods to organize and run work. Prepare for the top jobs.
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STOP that WATER
With FORMULA NO. 640
A clear liquid which penetrates 1" or more into concrete, brick, stucco, etc., seals—hold 1250 lbs. per sq. ft. hydrostatic pressure. Cuts costs. Applied quickly—no mixing—no cleanup—no furring—no membranes. Write for technical data—free sample.
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DECALS
SAVE UP TO 25% ON YOUR DECALS
10 DAY DELIVERY
FOR PRICES SEND ROUGH PENCIL SKETCH OF DECAL YOU ARE NOW USING
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214 South Washington
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Our Reader Service Dept. will send such articles pasted on standard file size sheets if you request it.

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65,000 sq. ft. Building Erected in 60 Days with LACLEDE CONSTRUCTION STEELS

Laclede Steel service and construction know-how combined to give Ritepoint Company of St. Louis a new permanent-type building in a hurry. The short completion time resulted from using Laclede steel joists, reinforcing bars and welded wire fabric.

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Producers of Construction Steel

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St. Louis, Mo.

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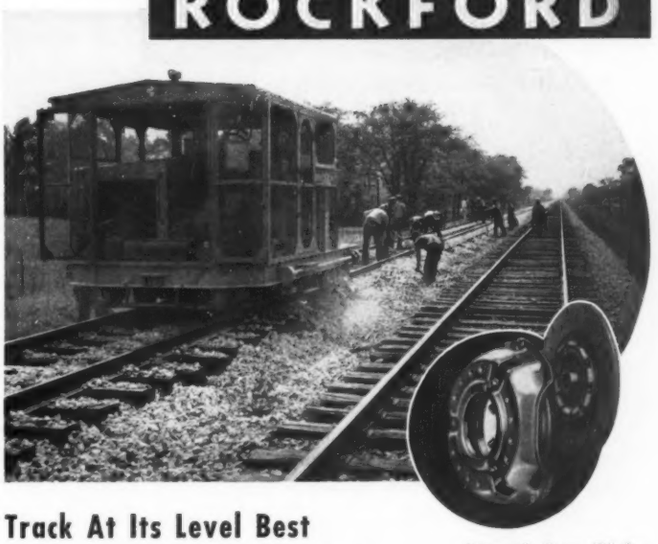
CLUTCHES by ROCKFORD



Track At Its Level Best Tamped At The Lowest Cost

PULLMAN-STANDARD POWER BALLASTER'S exceptional production rate, low labor requirement and powerful triple-action compaction produce a lower per-foot-cost for long-lasting track ballast. ROCKFORD CLUTCHES help them operate efficiently at exact, but constantly changing, work positions. Whatever your power transmission control problem — let ROCKFORD clutch engineers help you solve it.

Send for This Handy Bulletin

Shows typical installations of ROCKFORD CLUTCHES and POWER TAKE-OFFS. Contains diagrams of unique applications. Furnishes capacity tables, dimensions and complete specifications.

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314 Catherine Street, Rockford, Illinois, U.S.A.

Manufacturer Memos

New Armco Vice President

William O. Robertson, manager of the eastern division of Armco Drainage & Metal Products, Inc., a subsidiary of the Armco Steel Corp., Middletown, Ohio., has been elected a vice president of the company. He will continue to manage the eastern division in addition to his new duties.

Mr. Robertson joined Armco in 1929 when he became associated with the Ingot Iron Railway Co., an Armco subsidiary. In 1939, he was transferred to Armco Railroad Sales Co., Inc., as eastern district manager. His first assignment with Armco Drainage came in 1943, when he was made assistant manager of the contracting division.

In 1946, Mr. Robertson was appointed sales manager of the eastern division. He was named manager early in 1953.

Chairman for Rockwell

Col. Willard F. Rockwell, who has resigned as assistant to Secretary of Defense Charles E. Wilson, has returned to his position as chairman of the board of directors of Rockwell Mfg. Co., Pittsburgh, Pa. He joined the Defense Department last April at the request of President Eisenhower and Secretary Wilson. Earlier this year, Col. Rockwell took part in the Mutual Security Agency evaluation study of American aid abroad as assistant to MSA Director Harold Stassen.

Flexible Steel Elects

Milton N. Beach has been elected president and general manager, and John P. Ramsey has been elected vice president and sales manager of Flexible Steel Lacing Co., 4704 Lexington St., Chicago 44, Ill., manufacturer of belt fasteners for joining conveyor and transmission belting.

Phillip Rinaldo was re-elected treasurer, and Hugh L. Coats continues as secretary of the company.

Mr. Beach has been a member of the firm for 35 years and served as vice president for 22 years.

William Rodgers, vice president and general sales manager of Blaw-Knox Co.

New Blaw-Knox Officer

William Rodgers has been elected vice president and general sales manager of the Blaw-Knox Co., Pittsburgh, Pa., manufacturer of construction equipment. He has been in the construction materials industry for many years and has also had experience in the motor transport field. Mr. Rodgers is a director of the Granite City Steel Co. During World War II, he served in Africa and Italy.

American Tractor Names Milligan Vice President

David A. Milligan has been appointed vice president in charge of sales for the American Tractor Corp., Churubusco, Ind. He will assume responsibility for increased distribution and sales in both the industrial and agricultural fields and will assist in the development and coordination of specialized equipment for the industrial, agricultural, and materials-handling fields.

Mr. Milligan was formerly sales manager for Harry Ferguson, Inc. In addition to his recent work in the wheel tractor field, he has had 12 years experience in the design and manufacture of crawler tractors and industrial equipment.

Denman Elected by P-M

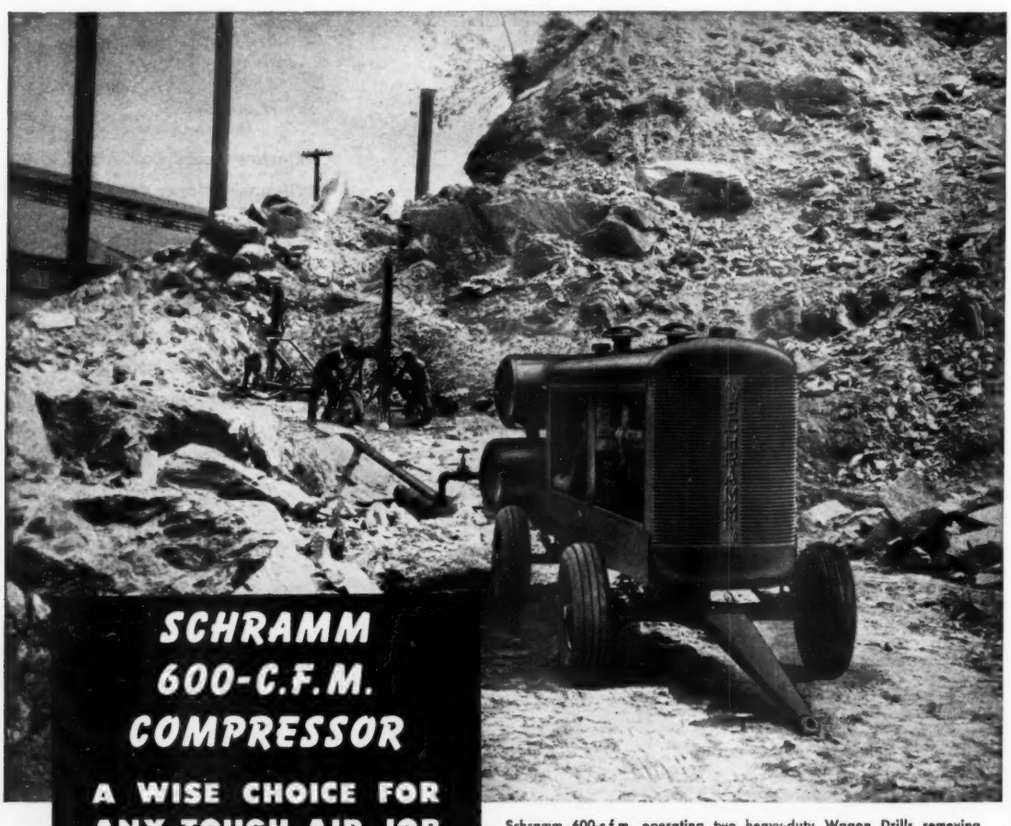
L. E. Denman has been elected assistant treasurer of the Pettibone Mulliken Corp., 4700 W. Division St., Chicago 51, Ill., manufacturer of road-building and construction equipment. He will make his headquarters at the home offices in Chicago.

Mr. Denman formerly was comptroller and assistant secretary of Hibbard Spencer Bartlett & Co., Evanston, Ill. Before that, he was assistant secretary and assistant treasurer of Continental Assurance Co., Chicago.

Air Reduction Elects

Howard H. Foster has been elected treasurer of Air Reduction Co., Inc., New York, N. Y., succeeding William Winters, Jr., who retired after 35 years of service with the company.

Mr. Foster joined Air Reduction in 1933, and has served in various sales and management positions. In 1946, he was appointed manager of business relations, and earlier this year he was elected to the post of assistant treasurer.



Schramm 600-c.f.m. operating two heavy-duty Wagon Drills removing 165,000 yards of rock excavation. Operating two — ten-hour shifts, this Schramm Compressor is in constant use twenty hours per day.

BECAUSE YOU GET . . .

FUEL SAVINGS UP TO 50% . . . Pneumastat control . . . Modern engine design . . . Proper operating speeds . . . Less horse power required by compressor . . . Super-efficiency compressor design.

SIMPLIFIED DESIGN . . . Fewer parts . . . Engine parts are interchangeable with compressor parts for lower maintenance . . . Cam operated mechanical intake valves provide greater efficiency.

SAFETY FEATURES . . . Electric push-button starter . . . Stronger, 400# test air receiver . . . Heavy grill for radiator protection . . . Easy accessibility to operating parts . . . No protruding parts.

MORE PLUS FEATURES . . . Tool boxes large enough to carry complete assortment of tools . . . Engine and Compressor cooled by water and unit can be operated with doors in place . . . Dual fan belts.

SCHRAMM, INC. • *The Compressor People* • WEST CHESTER, PENNSYLVANIA

SCHRAMM AIR COMPRESSORS

A SIZE AND MODEL FOR EVERY AIR NEED

E. A. Smith, vice president and manager of Koehring subsidiaries.

Koehring Appoints Smith

E. A. Smith has been appointed vice president and manager of two export sales subsidiaries of the Koehring Co., Milwaukee 16, Wis. The subsidiaries, the Koehring Inter-American Co. and the Koehring Overseas Co., handle construction and road-building equipment manufactured by Koehring and its subsidiaries.

Until his appointment, Mr. Smith was a sales engineer for the C. S. Johnson Co., Champaign, Ill., another Koehring subsidiary. He replaces R. E. Stewart, who recently resigned, and his new office will be in Milwaukee.

Powers, Dodge Promoted By General Tire & Rubber

The promotions of John E. Powers and Howard M. Dodge to the positions of vice president have been made by The General Tire & Rubber Co., Akron, Ohio. Mr. Powers has been serving as general sales manager of plastics and special products, while Mr. Dodge has been head of the company's mechanical goods division.

Mr. Powers has been in the tire industry since 1925, mainly in executive sales capacities. He joined General Tire & Rubber in 1934 as a territory sales representative and has since served as assistant eastern division sales manager, manager of the New York branch, a member of the sales executive staff, and trade sales manager.

Mr. Dodge joined the company in 1936 after working in the rubber business since 1914. He started the company's mechanical goods division, which now includes three plants.

Atlas Promotions

Albert W. Strahorn has been made assistant chief engineer of the Atlas Powder Co., Wilmington 99, Del. Henry T. Clark succeeds him as manager of Atlas' explosives works in Richmond, Calif.

Mr. Strahorn started his business career with Atlas more than 23 years ago as assistant works engineer in the Joplin, Mo., plant. Mr. Clark joined Atlas as a chemical engineer in the firm's Reynolds, Pa., explosives plant. He comes to his new position from Chattanooga, Tenn., where he had been director of the volunteer ordnance works, operated for the Government by Atlas.

DeWalt Sales Manager

Named as district sales manager for DeWalt Inc., a subsidiary of the American Machine & Foundry Co., is Charles W. Snyder, who has been with the DeWalt organization since 1939. Mr. Snyder's territory will include Delaware, the southern part of New Jersey, and the eastern part of Pennsylvania.

Mr. Snyder has served as field service engineer, assistant plant superintendent in charge of procurement and expediting of materials, and head of the metal cutting and special installations division.

Galion Appoints Sheffer

Robert R. Sheffer has been appointed regional sales manager in charge of Ohio, West Virginia, Michigan, western Pennsylvania, and western New York for the Galion Allsteel Body Co., Galion, Ohio. Mr. Sheffer will supervise sales of Allsteel dump bodies, hydraulic hoists, and Load-evator rear-end truck loaders.

Clark Names Killebrew

Clarance E. Killebrew has been named manager for marketing and sales of the construction machinery division of the Clark Equipment Co., Buchanan, Mich., manufacturer of materials-handling equipment. Mr. Killebrew will work with products formerly manufactured by the Michigan Power Shovel Co., which was acquired by Clark in May.

Mr. Killebrew joined the Clark Equipment Co. in the latter part of 1952.

How a CAT* No. 12 grades to **fine tolerances**

THE 16-acre Skyway Drive-in Theater, Nashville, Tennessee, must be resurfaced each spring before the season opens. McDowell & McDowell, of Nashville, do this job with a Caterpillar No. 12 Motor Grader. It pulls all the ditches and spreads crushed rock to a depth of 6 inches on the roads and 4 inches on the ramps. The project calls for moving 29,000 tons of stone, and the grader handles 1000 tons a day, making 4 passes over each line of ramp and road.

For good drainage and smooth parking a job of this kind demands grading to very close tolerances. And the Cat No. 12 "hits it on the nose." How is it possible for the big yellow machine to work within ½ inch of grade?

Perfect balance of power, frame and blade is one reason. Others are positive, easy-acting controls, constant mesh transmission and full range of blade positions. But most important of all is job visibility. The operator *doesn't have to stand* to see his work. From the driving seat he can watch the front wheels and both ends of the blade, keeping them in exact adjustment.

Fuel economy, simplicity, durability and long life are other advantages of the No. 12 Motor Grader. No wonder Roscoe McDowell says: "If a fellow expects to stay in business he had better get Caterpillar equipment. It really does the job."

Your Caterpillar Dealer has the right machine for your needs. He'll demonstrate it for you right on your own job, and he'll back its profitable work life with reliable service and genuine parts. Call him today!

Caterpillar Tractor Co., Peoria, Illinois.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

NAME THE DATE . . .
YOUR DEALER
WILL DEMONSTRATE

Rigs are push-loaded by 76 hp tractor in pebble-filled sandy clay. Load time for 5½ pay yds. runs as low as 35 seconds.

Two 7-yd. Tournapulls out-work crawlers, 4-to-1

Kennedy Construction Co. of Ashburn, Georgia, had 60,000 yds. of red sandy clay to grade, level, and fill for Route 32 in Turner County. To handle 95% of the job, Mr. Kennedy bought 2 new D Tournapulls.

Hauls for the 28 mph "D's" averaged 2200 ft. one-way. Haul roads had a rolling resistance of about 90 lbs. and for a stretch of 500 ft. the haul was filled with ruts and chuck holes. Breaking in under these conditions, Tournapulls showed following production:

77 yards hourly on 4400' cycle

Working with a 76 hp pusher, each 122 hp Tournapull loaded 5½ pay yards of pebble-type red sandy clay in around 50 seconds. Haul down 6% grades for 2200 ft., dump, and return 2200 ft. up 6% grade took 6 minutes 20 seconds. Making a round trip every 7.2 minutes, each "D" delivered 7 loads per 50-minute hour. Combined output for the 2 Tournapulls on this haul was 77 pay yards hourly.

Over-all production was just as impressive. In 41 days, working 8 to 10 hours each day, the 2 Tournapulls hauled 54,000 yards. Average daily output for the 2 rigs under all conditions and haul distances, was about 1320 yards.

This kind of performance impressed everyone on the job. "They'll beat *anything* on longer hauls," said Supt. R. M. Overstreet of Ashburn.

"Cheaper to operate"

"D Tournapulls are the *only* rigs for road building," says Foreman R. J. Collins. "They are cheaper to operate than crawlers. They're faster and more maneuverable. On a 1500 to 2000-ft. haul, one 'D' will outwork a crawler, 4-to-1."

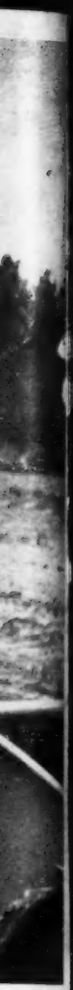
Ability to deliver more yards per hour . . . handle more jobs per year . . . earn more profit per job is the reason why successful dirt-movers everywhere are turning to high-speed, electric-control Tournapulls. Ask your LeTourneau-Westinghouse Distributor to show you what rubber-tired "D's" can do for *you*. Name the place . . . he'll be glad to demonstrate.

"D" spreads load near edge of road. Power-proportioning differential gives extra traction in soft going . . . also helps pull over ruts and out of chuck holes like those shown in photo below. Big 4-wheel multi-disc, air brakes and power-steering insure safety near banks, on steep narrow grades, and in traffic.

LeTourneau-Westinghouse Company

PEORIA, ILLINOIS

Tournapull—Trademark Reg. U.S. Pat. Off. DP-428-H-a



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